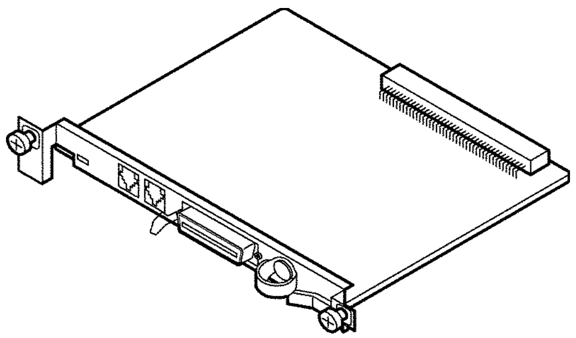
ORDER NO. KMS0510155CE

Service Manual

16-Port Analogue Trunk Card

KX-TDA6181X

(for Asia, Oceania, Middle Near East, Latin America, Russia and Africa)



⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you note the serial number, write down all of the 11 digits. The serial number may be found on the unit.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF, Standard laded, (Pb), solder can be used as usual on boards without the PbF mark.

When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

Panasonic

CONTENTS

1 ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:

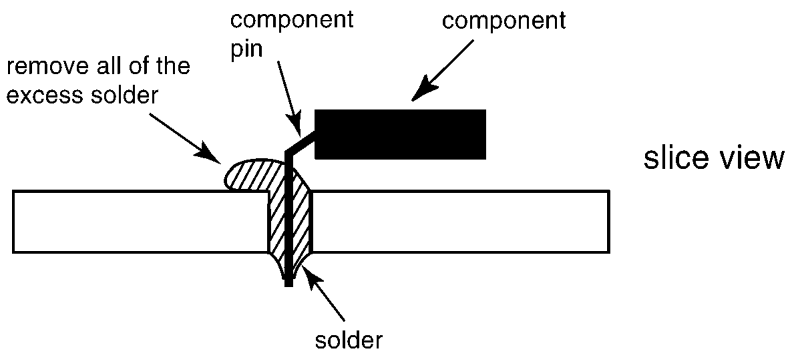
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin, (Sn), Silver, (Ag), and Copper, (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

Caution

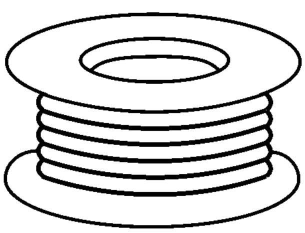
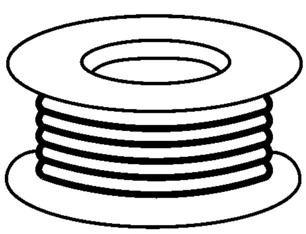
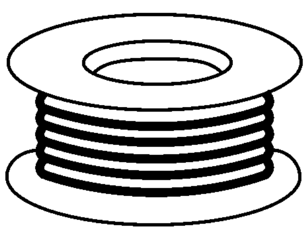
- PbF solder has a melting point that is 50° ~ 70° F, (30° ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° ± 20° F, (370° ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).
- If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).



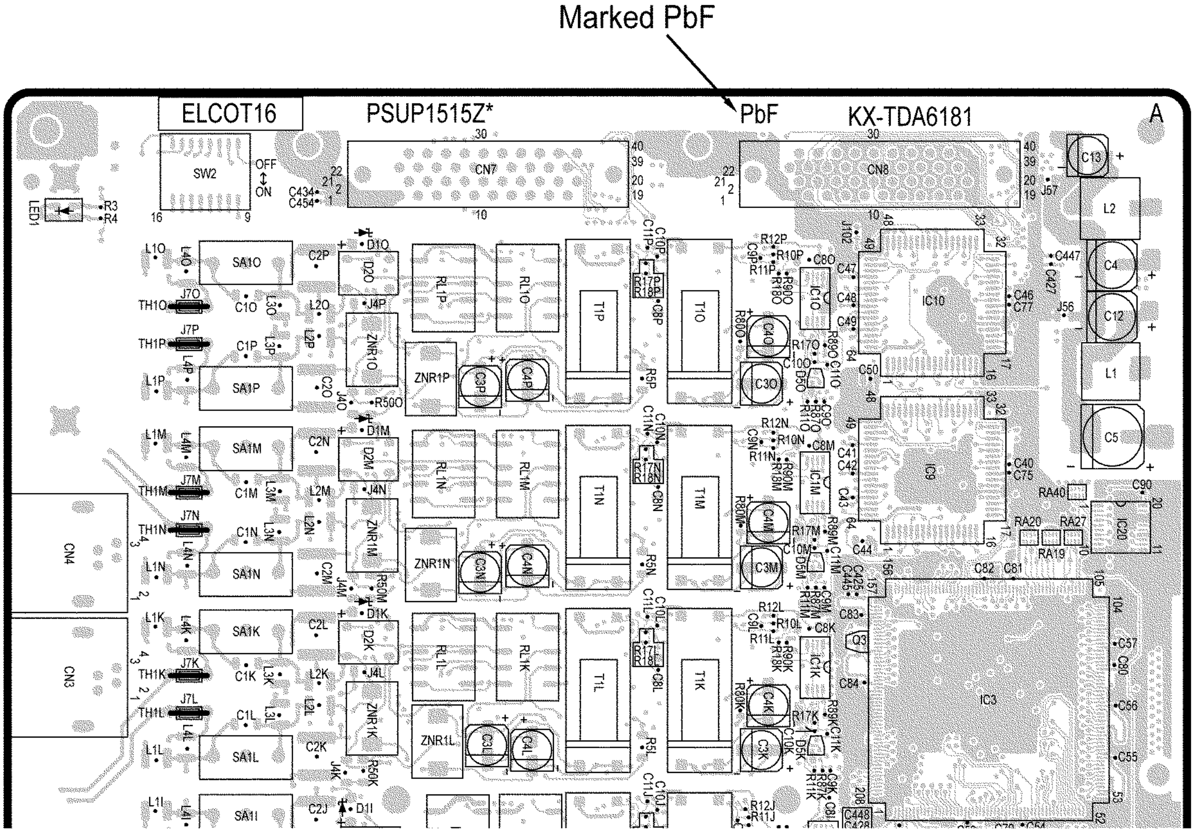
1.1. SUGGESTED PBF SOLDER

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper, (Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufacturer’s specific instructions for the melting points of their products and any precautions for using their product with other materials.

The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

1.2. HOW TO RECOGNIZE THAT Pb FREE SOLDER IS USED



ELCOT16 BOARD COMPONENT VIEW

2 FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover the plastic part´s boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not touch the IC or LSI pins with bare fingers.

3 GENERAL DESCRIPTION

This card is inserted in the free slot of the TDA600 system and is capable of connecting 16 analog loop start lines.

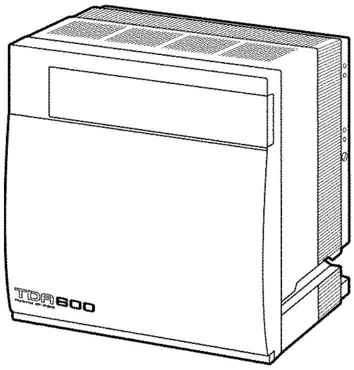
Up to 2 CALLER ID/PAYTONE card can be added on as option cards.

The LPR is an SH-1 (SH7020) with 512Kbyte flash ROM and 128Kbyte SRAM, and supports software version upgrade though downloading.

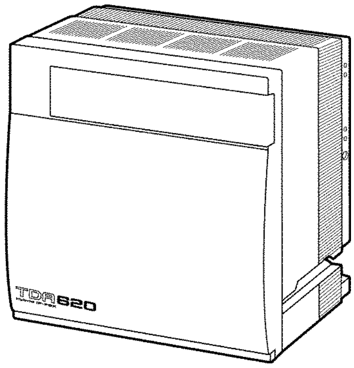
4 SPECIFICATION

Functional Block	Functional contents	
Analog External Line Interface	Number of Ports	16 ports
	Main Function	+30V 30mA Feeding function Dial Pulse Signal Transmission Function DTMF Signal Transmission Function Inversion Detection Function Bell Detecting Function Ring-off Signal Detection Function 2w/4w Conversion Function Surge Protection Function Returning Sound Generation Function 4ch CODEC Function • CODEC function • Power down function • μ/A law switching function • Test function (Loop back, Tone generation) • Programmable digital filtering function • Serial interface function • PIO function
DTMF Generator	Transmits arbitrary tones for every 16 line port	
Option Card	Can be installed two CO-CID/PT cards for eight lines	
On-board DC/DC Power Supply	Input +15V Output +15V, +5V, +3.3V	
Power Failure Forwarding Function	Supports four lines	
Self-diagnosis Function	Performed with the extension interface in pairs Channel Test, Dial Pulse Test, DTMF Test	
ASIC#2 (eSAMSON)	EC Bus interface function H.100 Bus interface function, Digital PLL function Local Bus interface function Time Switch Function, Gain Control Function Intelligent PIO Function, JTAG	
Control Unit	CPU	SH-1/SH7020 (12.288MHz)
	Flash ROM	512Kbyte
	SRAM	128Kbyte
LED Display Circuit	Card Status Display LED: 2-color (red/green)	
External Interface Connector	External Line Interface	50pin Amphenol Connector: 1 unit
	Power Failure Transfer	4pin Modular Jack: 2 units

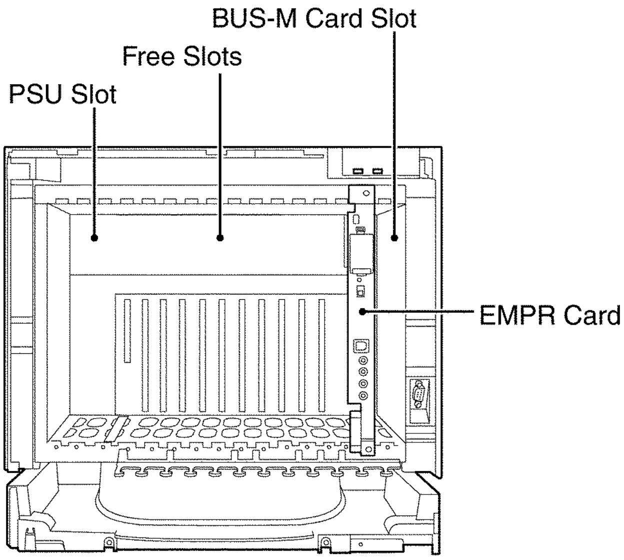
5 SYSTEM CONSTRUCTION



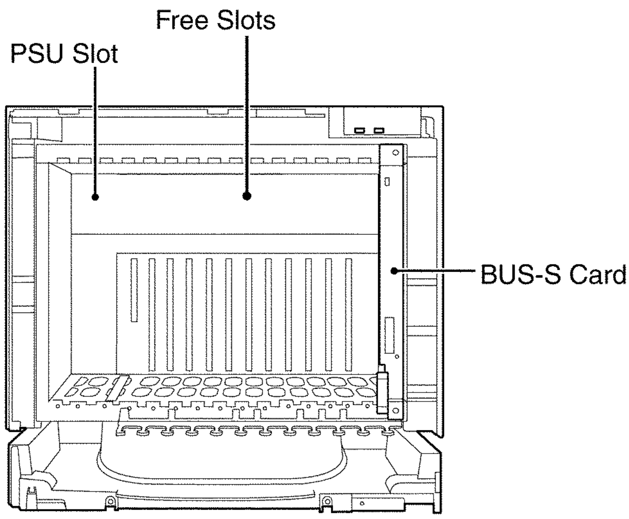
Basic Shelf
(KX-TDA600)



Expansion Shelf
(KX-TDA620)



Basic Shelf
(KX-TDA600)



Expansion Shelf
(KX-TDA620)

5.1. INSTALLING/REMOVING THE OPTIONAL SERVICE CARDS

Slot Condition

Card Type	Slot Type				
	KX-TDA600			KX-TDA620	
	Free 1-10	EMPR	BUS-M	Free 1-11	BUS-S
EMPR Card	No	Yes	No	No	No
BUS-M Card	No	No	Yes	No	No
BUS-S Card	No	No	No	No	Yes
Trunk Cards	Yes	No	No	Yes	No
Extension Cards	Yes	No	No	Yes	No
OPB3 Card	Yes	No	No	Yes	No
CTI-LINK Card	Yes	No	No	No	No
EECHO Card	Yes	No	No	Yes	No

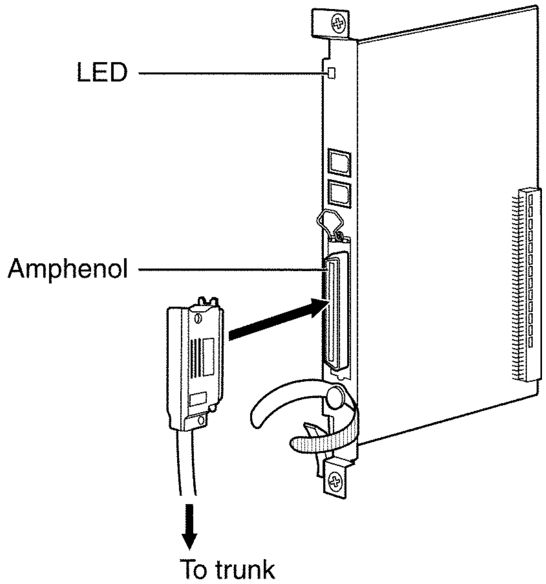
Caution:

To protect the back board from static electricity, do not touch parts on the back board in the main unit and on the optional service cards.To discharge static, touch ground or wear an earthing strap.

ELCOT16 Card

Function

16-port analogue trunk card with 4 power failure transfer (PFT) ports.



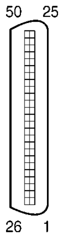
Accessories and User-supplied Items

Accessories (included): Screws X 2

User-supplied (not included): Amphenol connector

Pin Assignments

Amphenol Connector



No.	Signal Name	Function	No.	Signal Name	Function
1	RA	Ring port 1	26	TA	Tip port 1
2	RB	Ring port 2	27	TB	Tip port 2
3	RC	Ring port 3	28	TC	Tip port 3
4	RD	Ring port 4	29	TD	Tip port 4
5	RE	Ring port 5	30	TE	Tip port 5
6	RF	Ring port 6	31	TF	Tip port 6
7	RG	Ring port 7	32	TG	Tip port 7
8	RH	Ring port 8	33	TH	Tip port 8
9	RI	Ring port 9	34	TI	Tip port 9
10	RJ	Ring port 10	35	TJ	Tip port 10
11	RK	Ring port 11	36	TK	Tip port 11
12	RL	Ring port 12	37	TL	Tip port 12
13	RM	Ring port 13	38	TM	Tip port 13
14	RN	Ring port 14	39	TN	Tip port 14
15	RO	Ring port 15	40	TO	Tip port 15
16	RP	Ring port 16	41	TP	Tip port 16
17-25	Reserved	-	42-50	Reserved	-

LED Indications

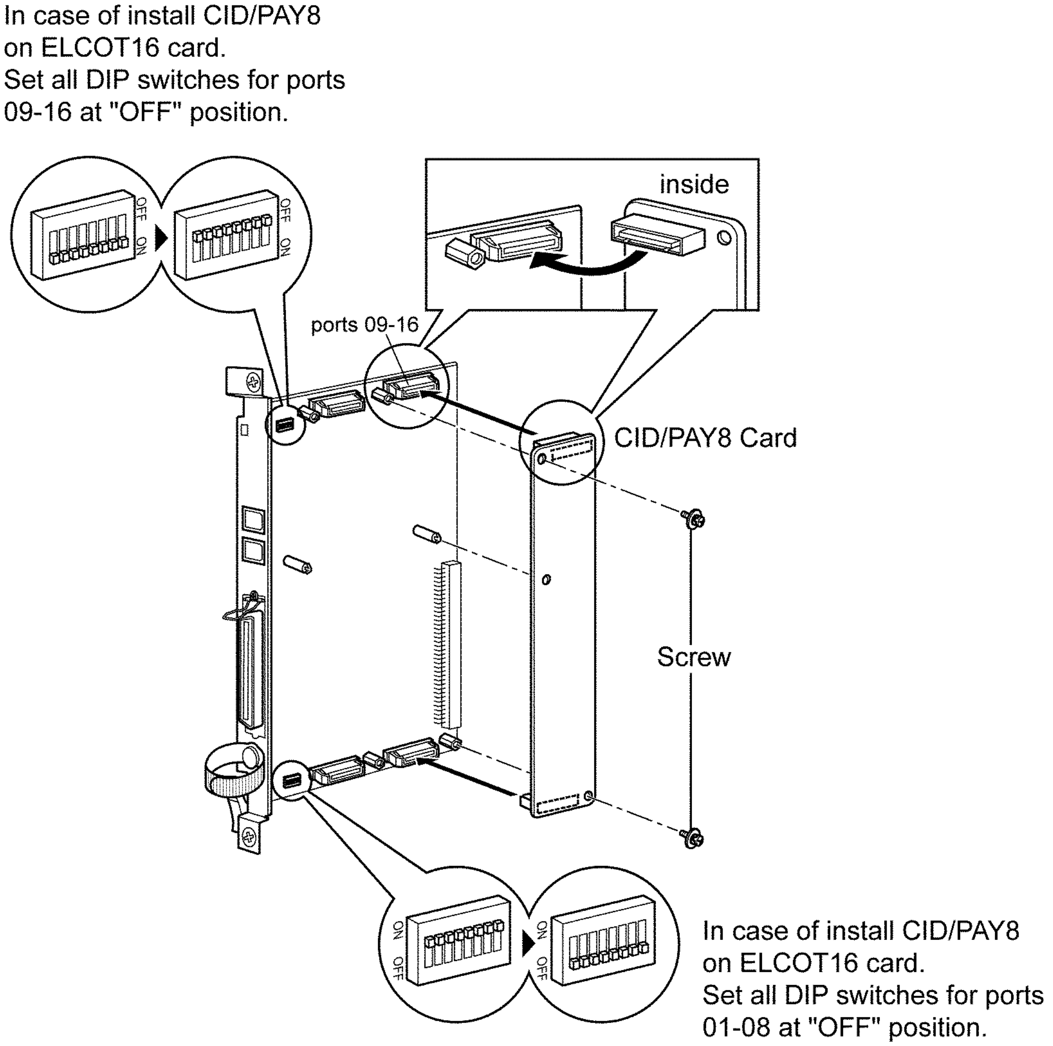
Indication	Color	Description
CARD STATUS	Green/Red	Card status indication OFF: Power Off Green ON: Normal (all ports are idle) Green Flash (60 times per minute): Normal (a port is in use) Red ON: Fault (includes reset) Red Flash (60 times per minute): Out of Service

In case of install CID/PAY8 on ELCOT16 card

Function

CID/PAY8: 8-port Caller ID signal type FSK/FSK (with Visual Caller ID)/DTMF, and 8 ports of Pay Tone Service (12 kHz/16kHz).To be mounted on the ELCOT16 cards.

CID8: 8-port Caller ID signal type FSK/FSK (with Visual Caller ID)/DTMF, To be mounted on the ELCOT16 cards.



Accessories and User-supplied Items

Accessories (included): Screws X 2

User-supplied (not included): none

Switch Settings (In case of install CID/PAY8 on ELCOT16 card)

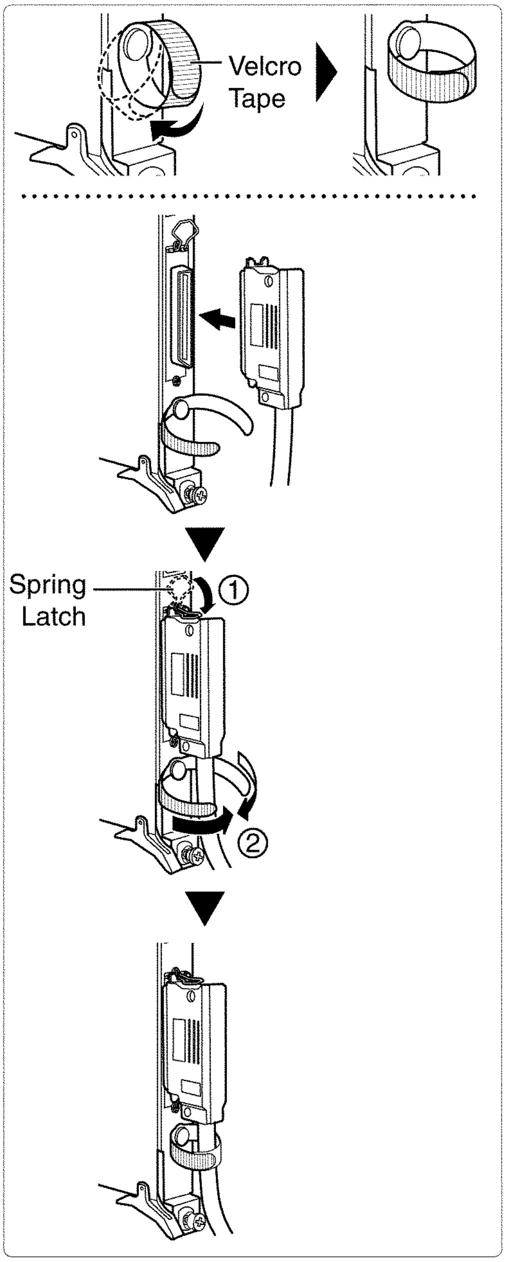
Switch	Type	Usage and Status Definition
Port Setting	DIP	Set all DIP switch at “OFF” positions.

Fastening Amphenol Type Connector

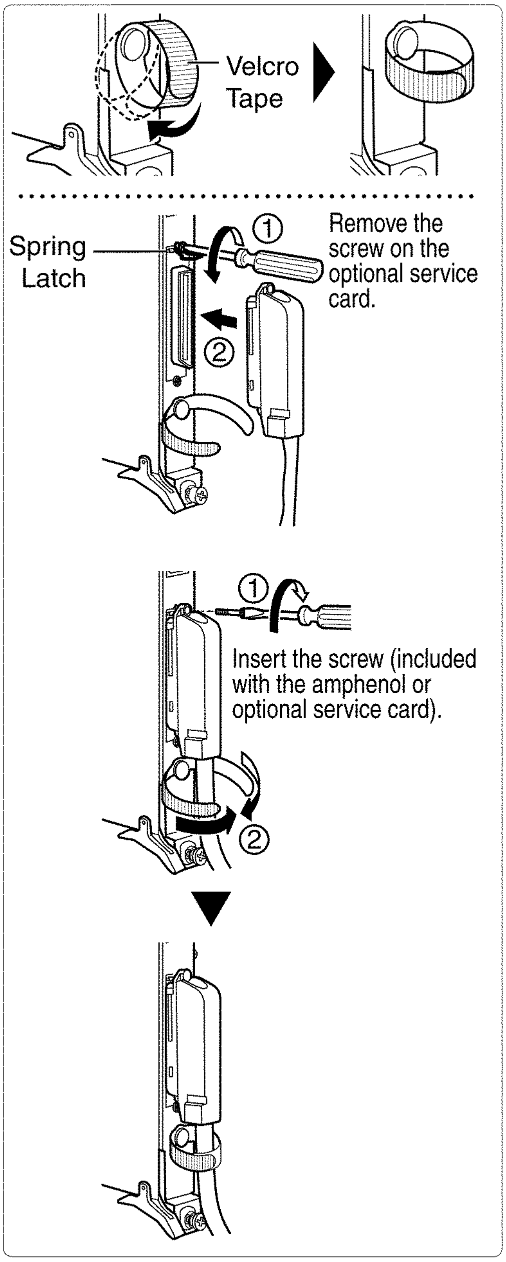
An amphenol 57JE type connector is used on some of the optional sevice cards.

To connect an amphenol connector, use the spring latch or screw to fix the upper part and use Velcro® tape to fix the lower part of the connector.

Type A (Spring Latch + Velcro Tape)



Type B (Screw + Velcro Tape)



Using Analogue Trunk Card and Extension Card

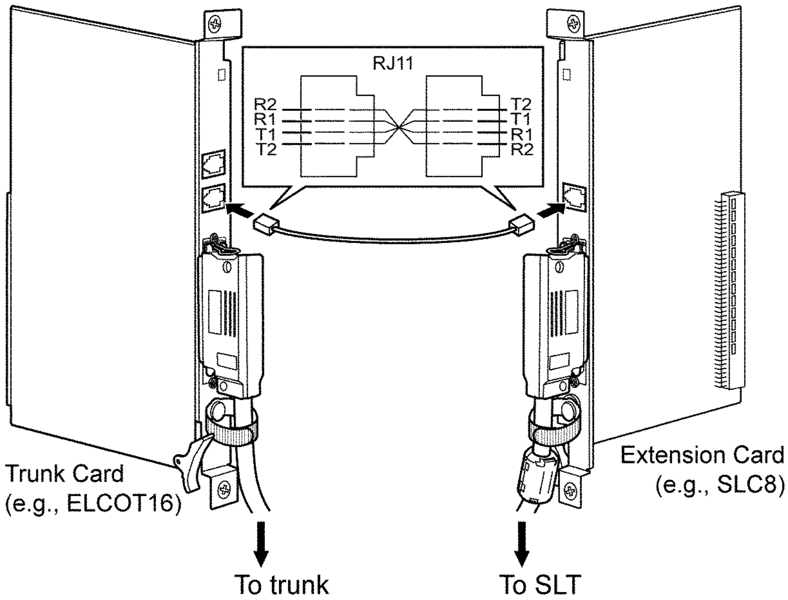
Power Failure Connection connects a specific SLT and a trunk in the event of power failure. The following analogue trunk and extension cards can be used for Power Failure Connections:

- Analogue trunk card: ELCOT16 (4 PFT ports)
- Extension card: EMSLC16 (4 PFT ports), ESLC16 (4 PFT ports), DHLC8 (2 PFT port) and SLC8 (2 PFT port)

To 1 analogue trunk card, connect only 1 extension card.

Note:

- Power Failure Connections must be made within the same shelf.
- By programming the Hybrid IP-PBX, a trunk conversation established during power failure can be maintained even when the power returns and the connection is switched back to the normal maintained even when the power returns and the connection is switched back to the normal performed, the connection will be dropped when power returns.



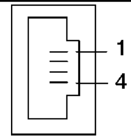
Accessories and User-supplied Items

Accessories (included): none

User-supplied (not included): RJ11 connectors

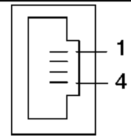
RJ11 Connector Pin Assignments for Analogue Trunk Card

PFT Ports 1 and 2



No.	Signal Name	Function
1	R2	Ring port 2
2	R1	Ring port 1
3	T1	Tip port 1
4	T2	Tip port 2

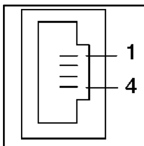
PFT Ports 3 and 4



No.	Signal Name	Function
1	R4	Ring port 4
2	R3	Ring port 3
3	T3	Tip port 3
4	T4	Tip port 4

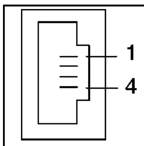
RJ11 Connector Pin Assignments for Extension Card

PFT Ports 1 and 2



No.	Signal Name	Function
1	T2	Tip port 2
2	T1	Tip port 1
3	R1	Ring port 1
4	R2	Ring port 2

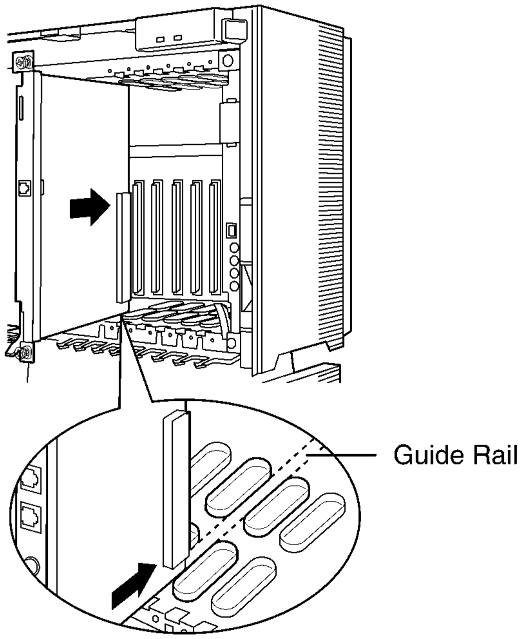
PFT Ports 3 and 4 (for EMSLC16/ESLC16 card only)



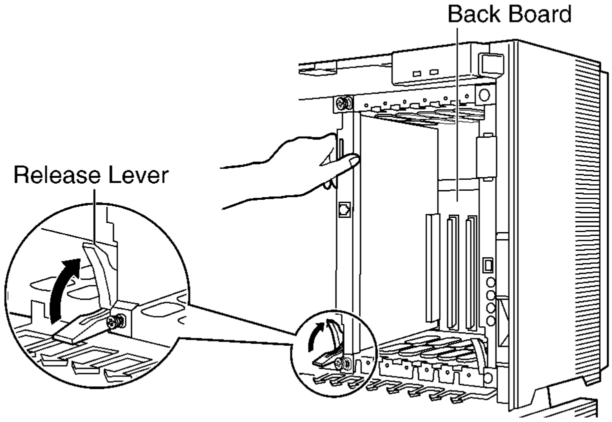
No.	Signal Name	Function
1	T4	Tip port 4
2	T3	Tip port 3
3	R3	Ring port 3
4	R4	Ring port 4

Installing Optional Service Cards

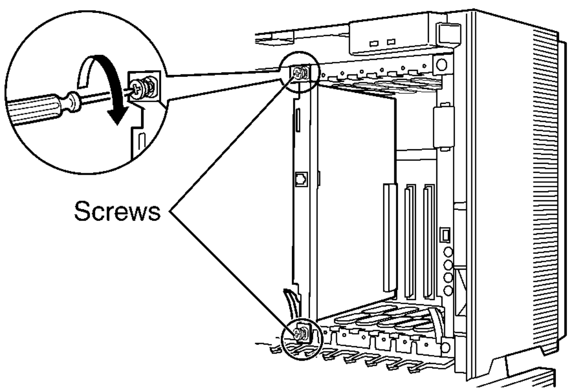
1. Insert the card along the guide rails.



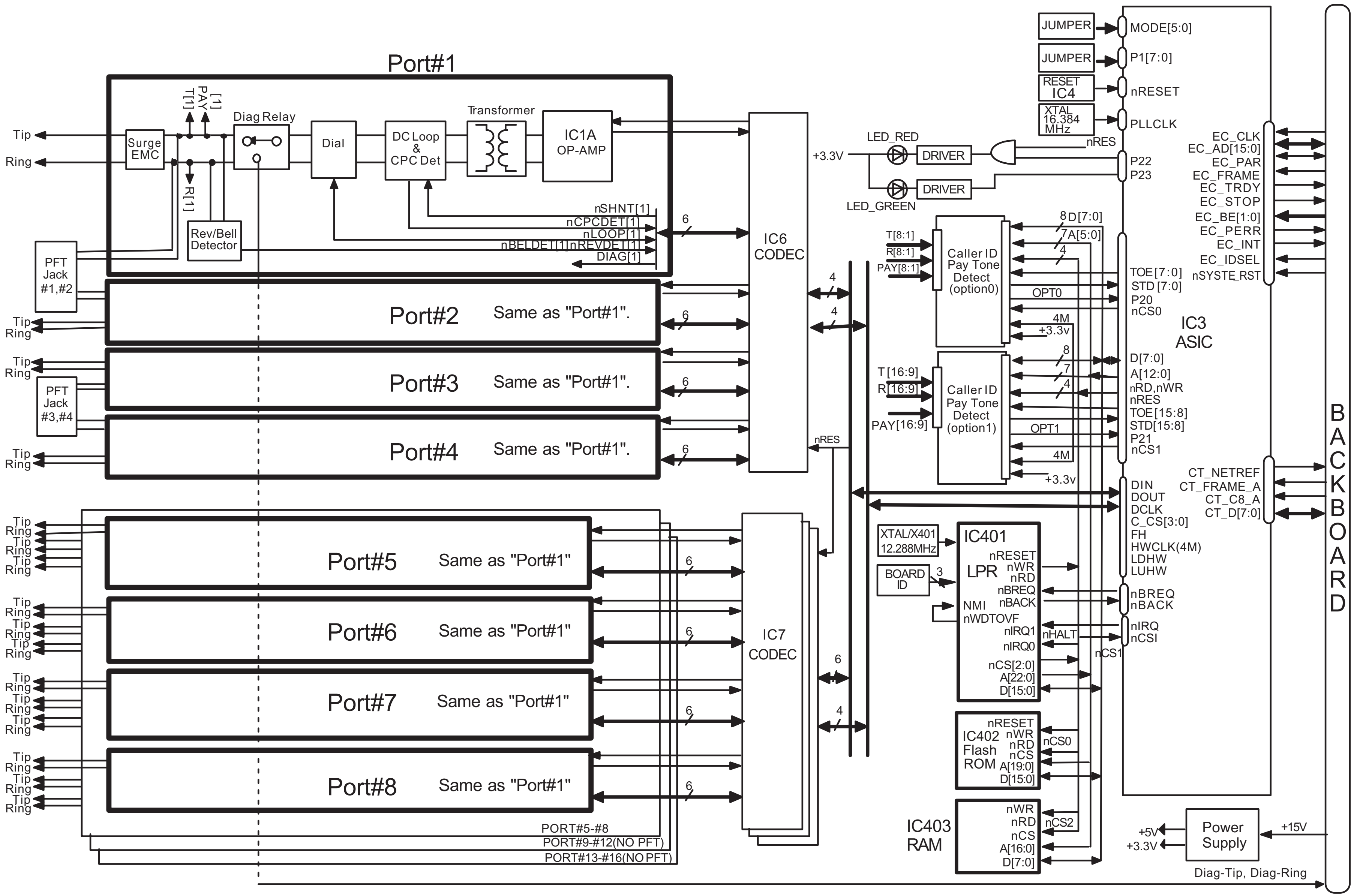
2. Holding the card as follows, push the release lever in the direction of the arrow so that the card is made to engage with the connector on the back board securely.



3. Turn the 2 screws clockwise to fix the card.



6 BLOCK DIAGRAM



KX-TDA6181X ELCOT16 CARD BLOCK DIAGRAM

7 CIRCUIT OPERATIONS

7.1. CONTROL-SYSTEM CIRCUIT

7.1.1. CPU Peripherals

- **CPU (System clock: 12.288 MHz)......IC401**

  Data bus: 16bit, Address bus: 23bit

- **Flash ROM (512Kbyte)......IC402**

  Flash memory consists of two areas: boot space and administration space.

  Administration program can be rewritten through downloading.

Address	Sector	Area
0	Sector 0 16KB	Boot (128KB)
4000	Sector 1 8KB	
6000	Sector 2 8KB	
8000	Sector 3 32KB	
10000	Sector 4 64KB	
20000	Sector 5 64KB	Administration (384KB)
30000	Sector 6 64KB	
40000	...	
70000	Sector 10 64KB	

- **SRAM (128Kbyte)......IC403**

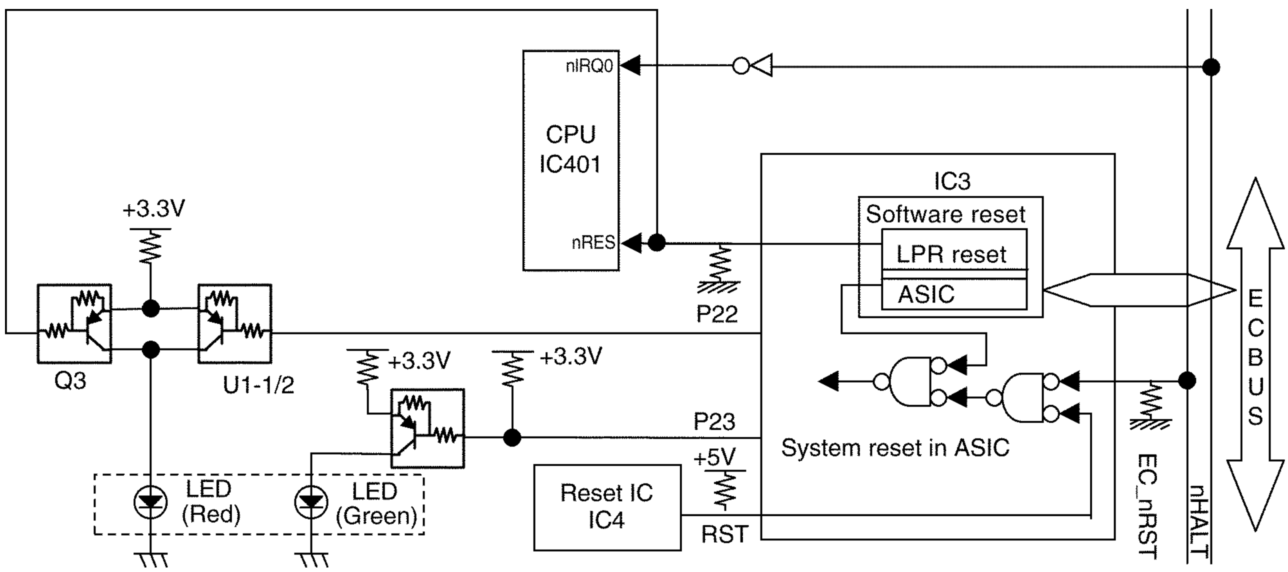
  Used for the data buffer for CPU work area.

- **Reset**

  Resets of an ELCOT16 card are roughly classified into the two kinds: ASIC reset and LPR reset.

  After the release of the ASIC reset, the LPR reset is released by the soft reset from the side of the main card and the LPR program is booted.

Type of reset	Reset method		Specification
ASIC reset	ASIC reset is reset under the AND condition of reset signals (negative logic) listed below.		
	Power-on reset	Reset by reset IC	
	Hard reset from the main bus	Reset by EC_RST signal	
	Soft reset from the main bus	Released after the specified time	
LPR reset	Soft reset from the main bus		Low active Reset pulse width: 1.6 microseconds or more



- **LED Operation status indicating LED (Two colors)**

  OFF: Fault

  Red ON: Fault (RESET included)

  Green ON: Normal (Line not in use)

  Green Flash (60/minute): Normal (Line in use)

Orange: OUS (Because OUS needs to be controlled by EMPR, reset terminal and port control terminal are ORed to generate OUS)

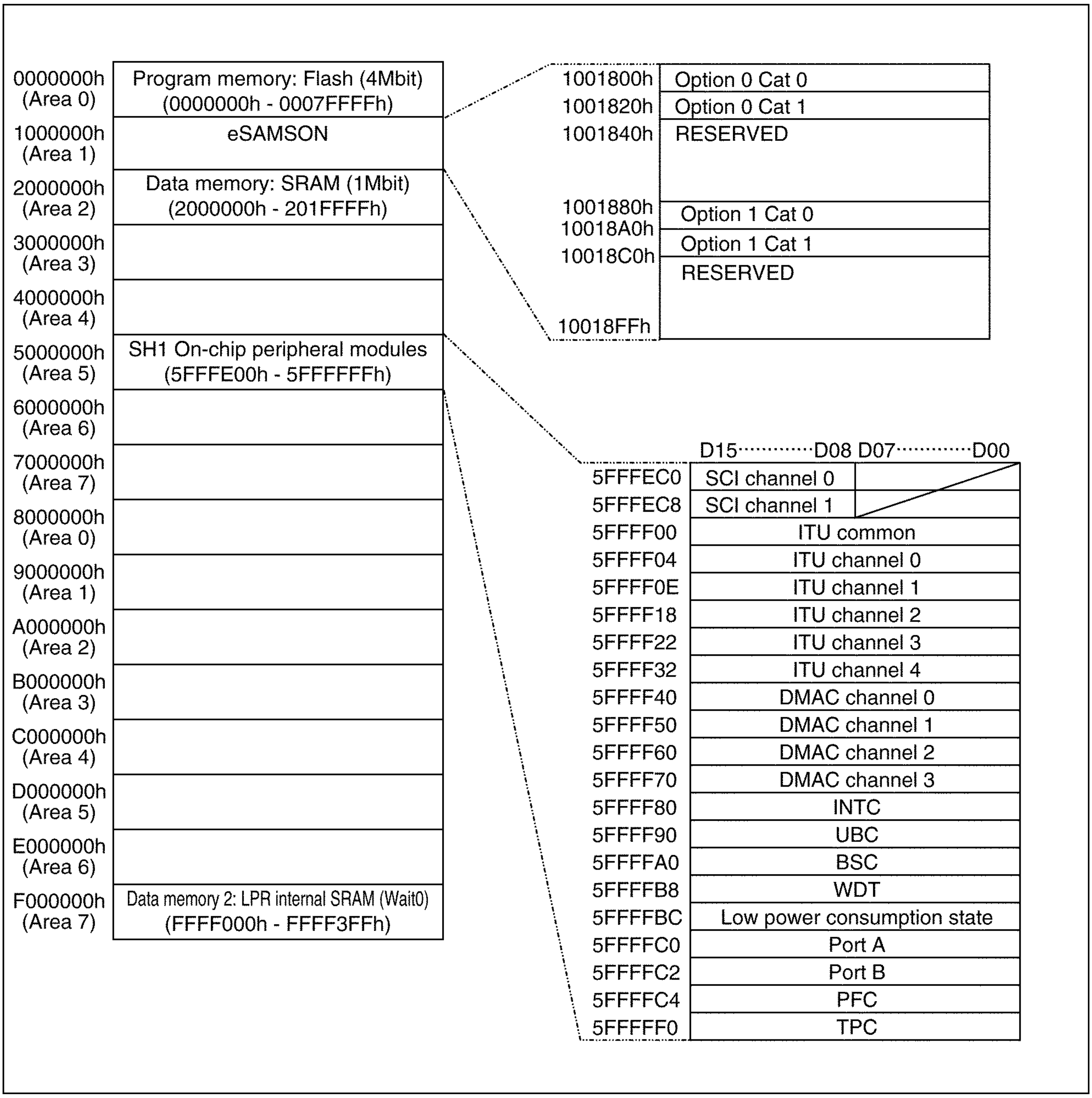
- **Instantaneous power interruption operation**

When instantaneous power interruption is 300msec or less, reset operation is not carried out because the voltage is retained by the capacitor in the power supply.

After HALT from EMPR is detected at the DC power down port, CPU goes into the sleep mode by executing the instruction of SLEEP.

At the sleep mode, the CPU/Clock enter the halt state while the contents of the register, the internal RAM, and the I/O port is maintained.

When the instantaneous power interruption is released, HALT is negated, and CPU is recovered to the normal mode by the detection of IRQ0=L



7.1.2. Time Slot Configuration

PCM data of an arbitrary stream, 0 - 15 (1 stream equals 128 time slots), on H.100 bus can be switched to an arbitrary local highway (64 time slots) using a local TSW.

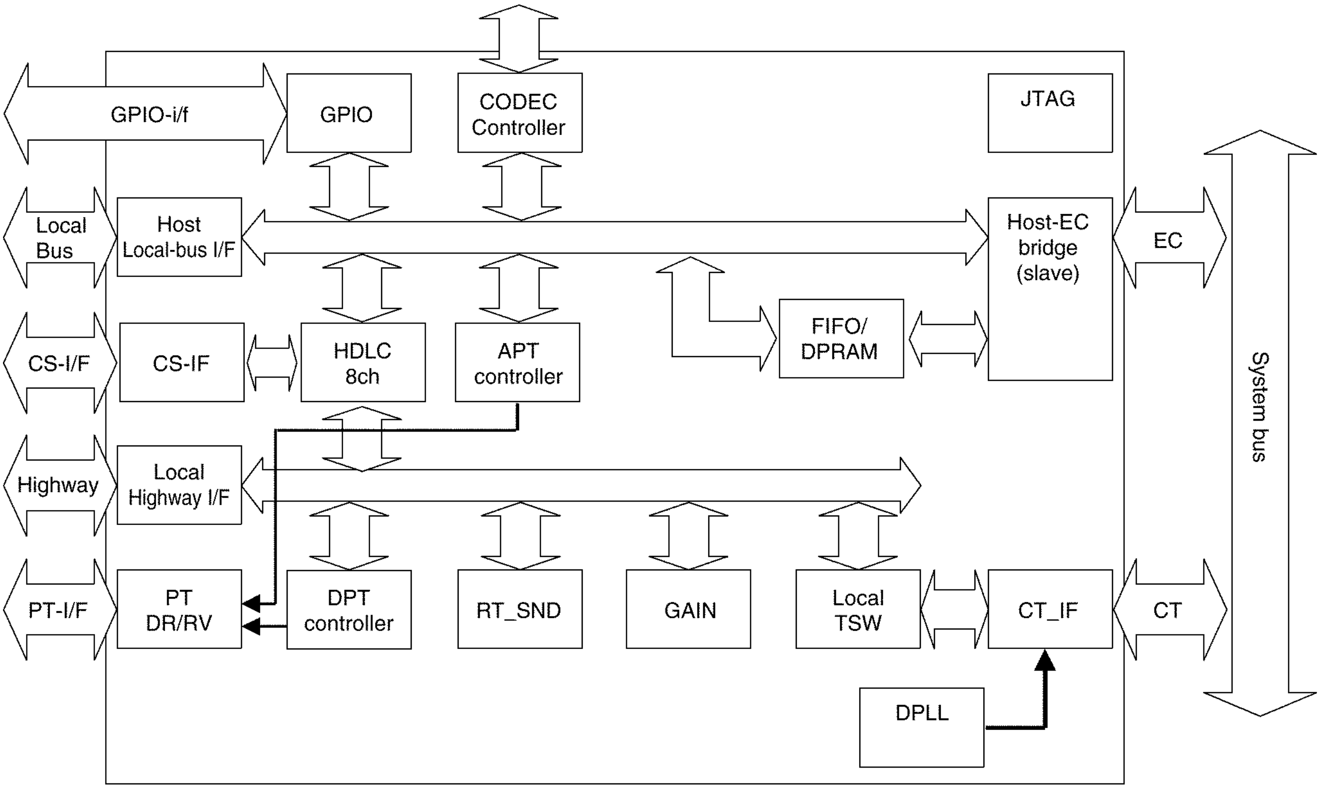
An example of time slot configuration of a local highway in ELCOT16 is shown below.

Slot	PCM Data
0	CO#1
1	CO#2
2	CO#3
3	CO#4
4	CO#5
5	CO#6
6	CO#7
7	CO#8
8	CO#9
9	CO#10
10	CO#11
11	CO#12
12	CO#13
13	CO#14
14	CO#15
15	CO#16

Slot	PCM Data
16	Not used
17	Not used
18	Not used
19	Not used
20	Not used
21	Not used
22	Not used
23	Not used
24	Not used
25	Not used
26	Not used
27	Not used
28	Not used
29	Not used
30	Not used
31	Not used

Slot	PCM Data
24~26	Not used

7.1.3. IC3 (ASIC)



- **EC bus interface**
  16bit/8MHz two-way address data multiplex self-bus.
- **CT bus interface**
  Supports eight 8.192MHz highways (128 time slots).
- **Local bus Interface**
  SH-1CPU by RENESAS Ltd. compatible bus with 8-bit data and 13bit address.
- **Local Highway Interface**
  Packs 2.048, 4.096, 8.192 MHz highway (Max.64 timeslot).
- **Local TSW**
  Timeslot switch between CT bus (1024ch) and local highway (64ch).
- Local Gain Control
  Gain control of the local highway up-down 64ch by 1dB/step randomly.
- PT Interface
  Selects the APT/DPT interface per port.
- CODEC interface
  A dedicated interface consisting of 4 Infineon PEB2466 chips for enabling the circuit controls.
- GPIO Interface
  A parallel interface that can be set in random interactively.
- **GPIO interface**
  Parallel interface that is arbitrarily programmable bidirectionally.

7.2. DESCRIPTION OF FUNCTIONS AND CIRCUITS

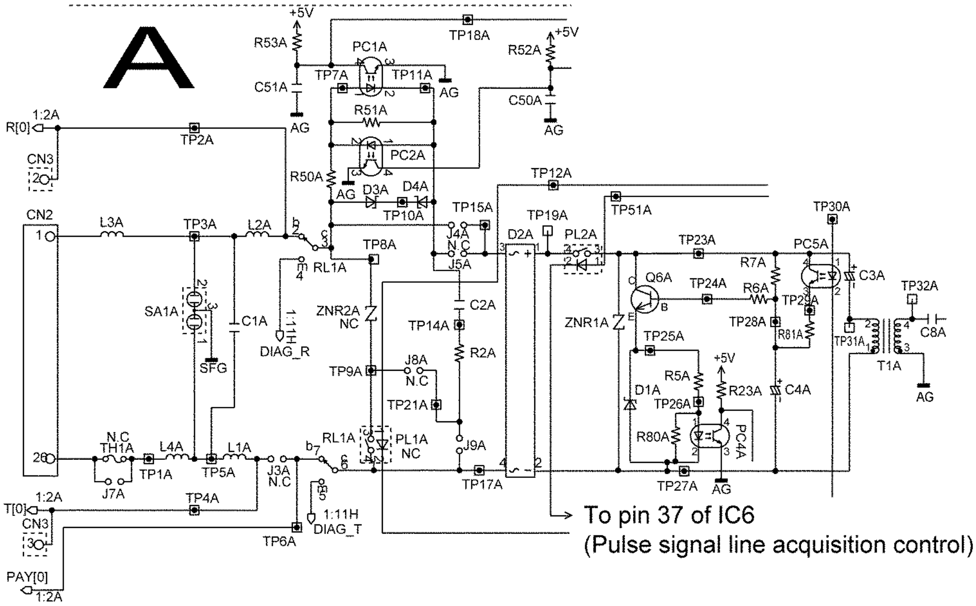
7.2.1. Dial Pulse Signal Transmission

Transmits 10pps/20pps dial pulse by a open/close action between Tip and Ring with Photo MOS relay.

The make width, break width and inter digital width for 10pps/20pps can be set respectively.

When making, 37pin (DIAL [0]) of IC6 becomes Low level, and PL2 turns ON. When breaking, 37pin (DIAL [0]) of IC6 becomes High level, and PL2 turns OFF.

It provides the SHUNT control function for the stabilization of line power depending on the destination. Turning ON PC5 when transmitting pulse reduces the impedance at making, and stabilizes the line power.



7.2.2. Circuit For Line Acquisition

Making 37pin (DIAL[0]) of IC6 Low level, the photo MOS relay (PL2) turns ON and the line is acquired.

It is used in common as Dial Pulse transmitting circuit.

DC Loop Path:

- Ring→L3→L2→RL1→J5→D2→PL2→Q6(C-E)→R5→R80→D2→RL1→J3→L1→L4→J7→Tip
- Tip→J7→L4→L1→J3→RL1→D2→PL2→Q6(C-E)→R5→R80→D2→J5→RL1→L2→L3→Ring

7.2.3. DTMF Signal Transmission

This transmits the DTMF signal on the highway timeslot. The different DTMF signals can be transmitted to the optional ports at the same time.

They are transmitted to the line through CODEC.

7.2.4. Bell Signal Detection

During on-hook, transmitting the bell signal to the AC loop in the CR series circuits (C2 and R2) detects the current by Photo Coupler (PC1,2), and it determines the presence of a bell signal. Software performs the operation for recognition and determination of a pattern of bell signals.

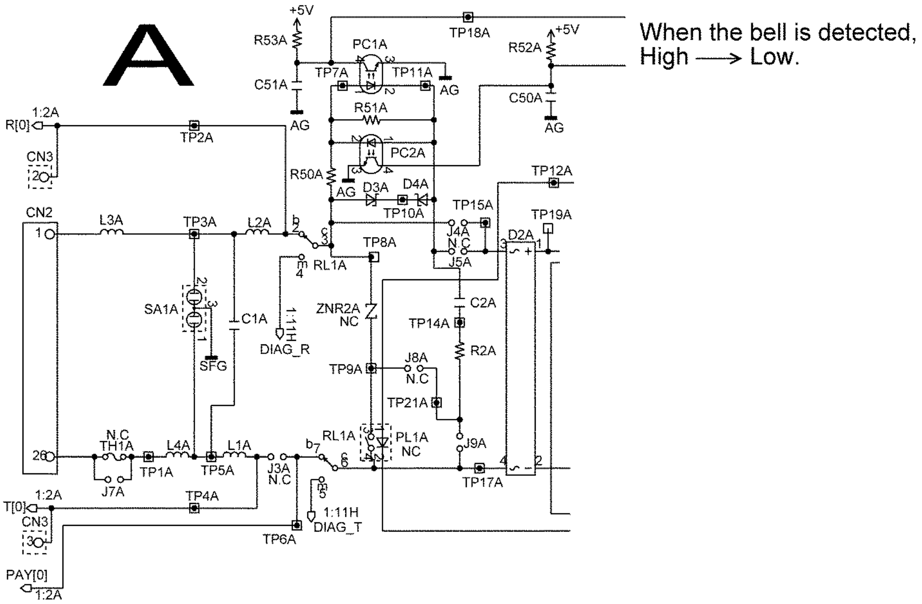
Bell Loop Path:

- Ring→L3→L2→RL1→R50→PC1(1-2)→C2→R2→J9→RL1→J3→L1→L4→J7→Tip

  In this path, PC1 4-pin converts from High to Low, and a bell signal is detected.

- Tip→J7→L4→L1→J3→RL1→J9→R2→C2→PC2(1-2)→R50→RL1→L2→L3→Ring

  In this path, PC2 4-pin converts from High to Low, and a bell signal is detected.



7.2.5. DTMF Signal Detection

This is provided on the CALLER ID detection card (CID8) and CALLER ID/PAYTONE detection card (CID/PAY8) of the option cards.

7.2.6. Polarity Reversal Detection

Configured by the photo couplers (PC1,PC2) which enables current detection in either the Tip → Ring or Ring → Tip directions. (PC2 is used in common as the bell detection photo coupler). Using Software, it stores the current direction (the detected photo coupler) of the connected trunk and adjusts the direction of the current flow detection. (the detected photo coupler changes).

When the current flows in the direction of Ring to Tip, PC1 4-pin is Low and PC2 4-pin is High.

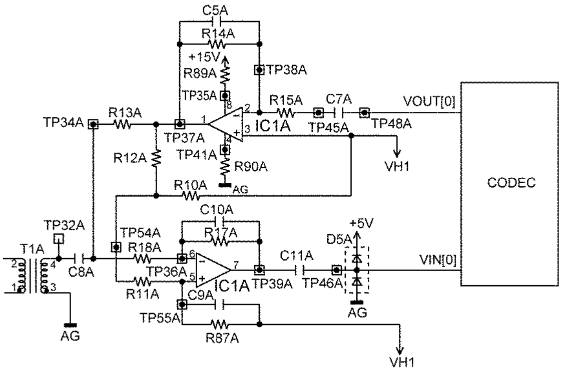
- Ring→L3→L2→RL1→R50→PC1(1-2)→J5→D2→PL2→Q6(C-E)→R5→R80→D2→RL1→J3→L1→L4→J7→Tip

When the current direction (polarity) is reversed from Tip to Ring, PC1 4-pin turns to High and PC2 4-pin turns to Low. It recognizes the action by changing of the current direction (the detected photo coupler changes).

- Tip→J7→L4→L1→J3→RL1→D2→PL2→Q6(C-E)→R5→R80→D2→J5→PC2(1-2)→R50→RL1→L2→L3→Ring

7.2.7. 2W-4W Conversion

This converts 4W-voice signal inside PBX and 2W-voice signal on SLT or Trunk. It is configured by Op-Amp and BN (Balance Network) in CODEC. It affects the return loss of the voice and the frequency characteristic, and is determined by setting the best value of Infineon CODEC and a software register.



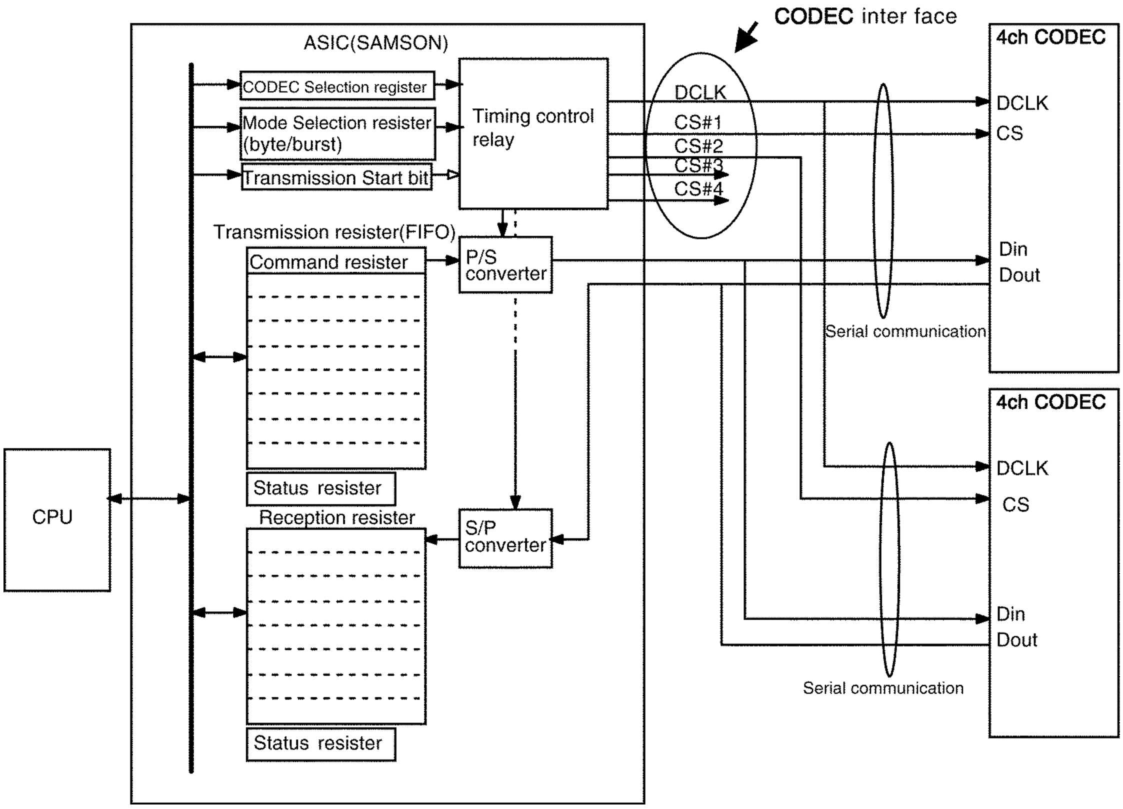
7.2.8. Interface

- CODEC Control...IC6, IC7, IC9, IC10

  This uses PEB2466 by Infineon. CODEC interface DCLK, CS, DOUT and DIN configure the analog characteristic such as BN, frequency characteristic, level, lateral constant. Also, the built-in I/O port is used as CPC detection, DIAL control, BELL detection, Reverse detection, DIAL Shunt control and DIAG relay control.

- A/D, D/A Conversion

  This converts 4Wire analog signal and G.711 PCM (μ/A).



7.2.9. Surge Protection

A gas arrester (SA1) with the discharge voltage 230V is mounted between T and SFG, R and SFG. And a discharge tube (SA3) with the discharge voltage 1KV is mounted between SFG and FG. Furthermore, ZNR (ZNR1) with the discharge voltage 82V is mounted on the PBX side of the photo MOS relay for each line.

7.2.10. Power Failure Port

At the time of the power failure, for enabling a direct call to the extension phone, 4lines out of 16lines can be connected to the SLT port, which provides a switching relay for power failure on the extension card, by a cable. It connects CN3, CN4 with the connector for power failure on the extension card.

7.2.11. Self-Diagnostic Relay

Self-diagnostic relays are mounted on each port. It enters normal mode at DIAG=L, and enters self-diagnostic mode at DIAG=H. At the self-diagnostic mode, Tip-Ring connects to Tip-Ring being in the pairing extension card via the backboard. That allows self-diagnostic feature to be performed.

The items of self-diagnosis for ELCOT16 circuits are BELL signal detection, line addition, dial pulse transmission and DTMF transmission.

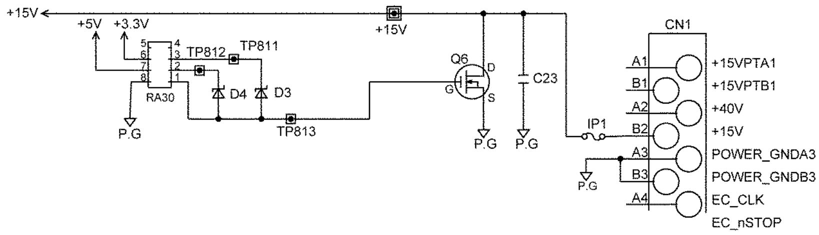
7.2.12. Option Cards

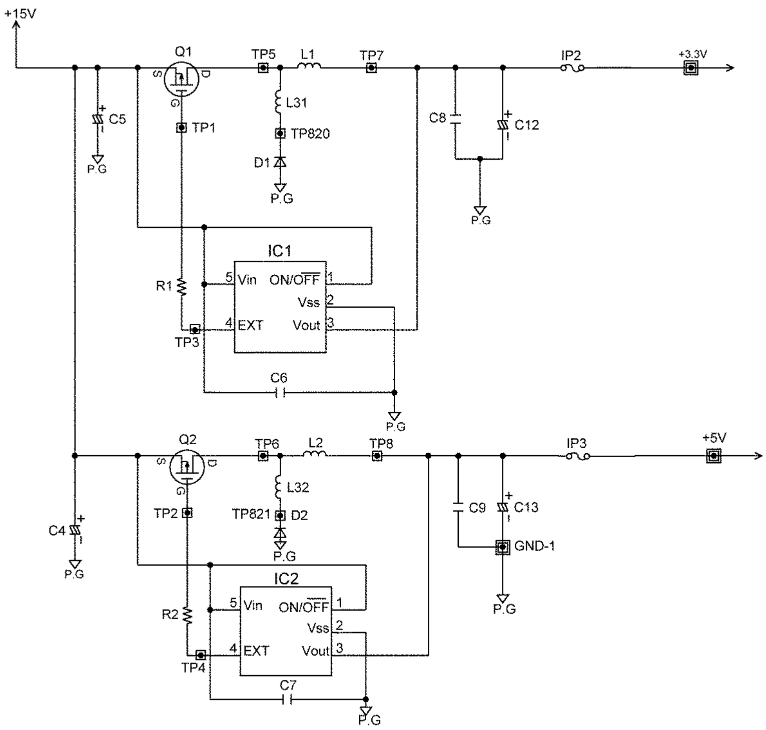
The following Option cards can be mounted :

1) 2 x Caller ID Detection cards (CID8).

2) 2 x Caller ID / Paytone Detection cards (CID/PAY8).

7.3. POWER SUPPLY CIRCUIT





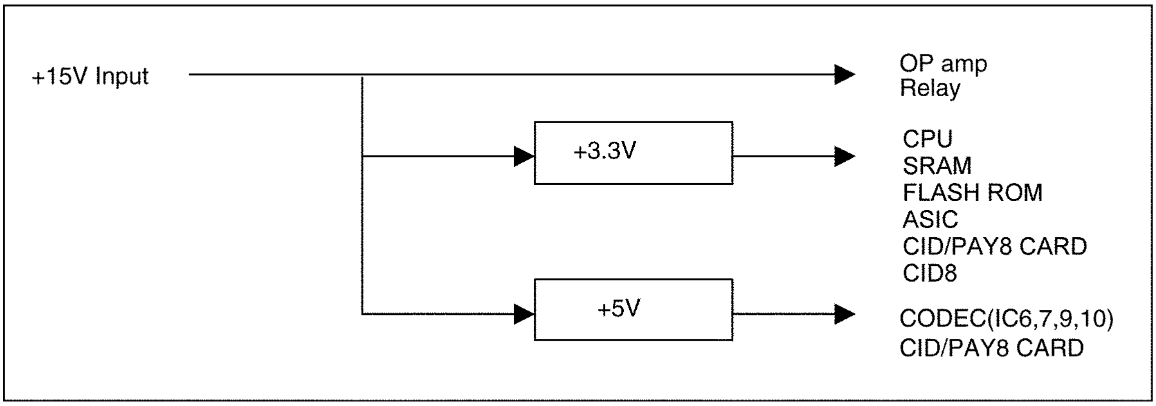
- DC/DC conversion circuit

  The circuit which generates output +3.3V, +5V with input +15V. It is configured with the circuit that reduces the voltage from +15V to +3.3V by IC1, Q1 and L31 switching power supply, and with the circuit that reduces the voltage from +15V to +5V by IC2, Q2 and L32 switching power supply.

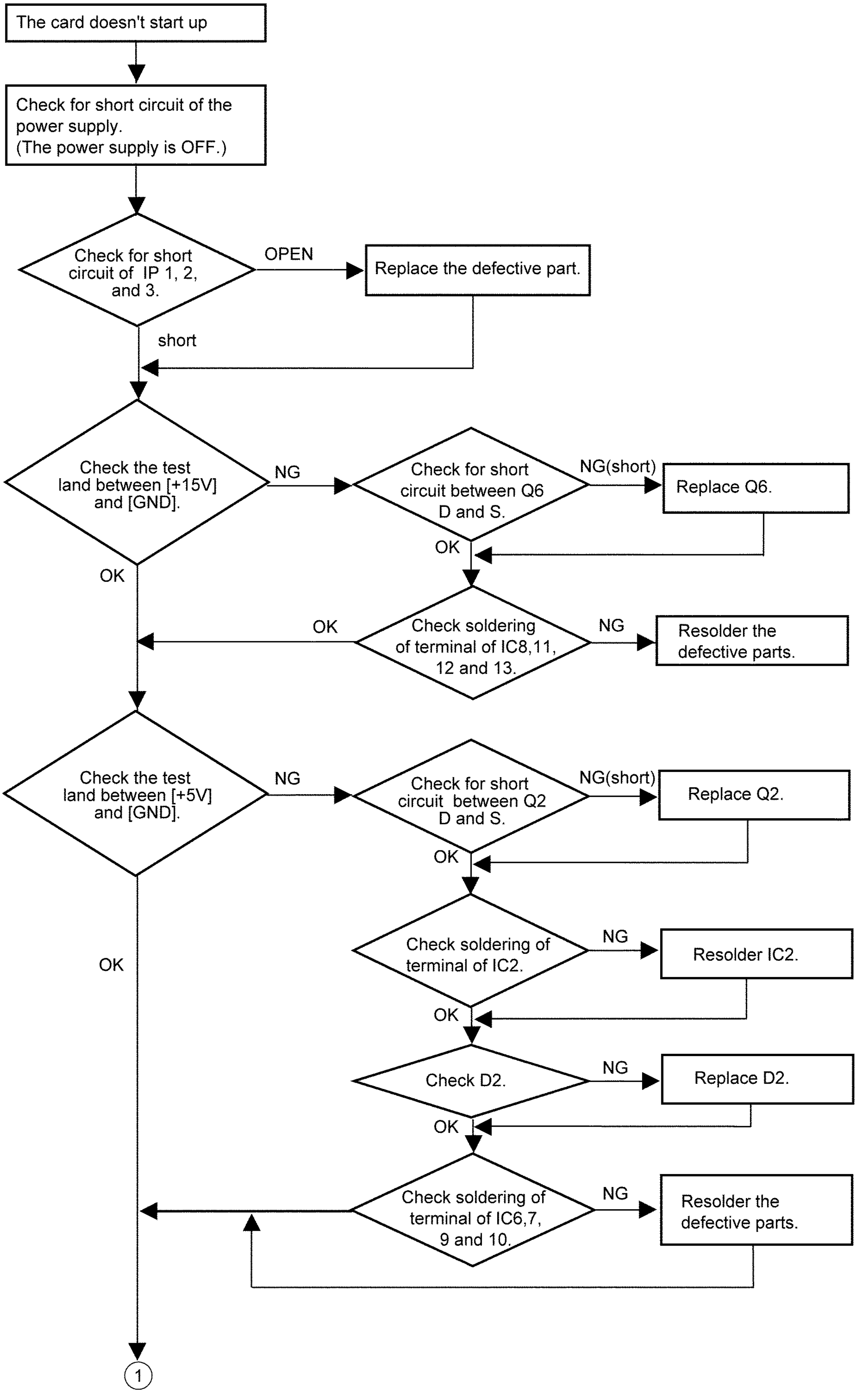
  There are some protection lines. First is IP2 for +3.3V short protection, second is IP3 for +5V short protection, third is the overvoltage protection which detects +3.3V/+5V excess voltage rise and makes the FET(Q6) turn ON which blows IP1.

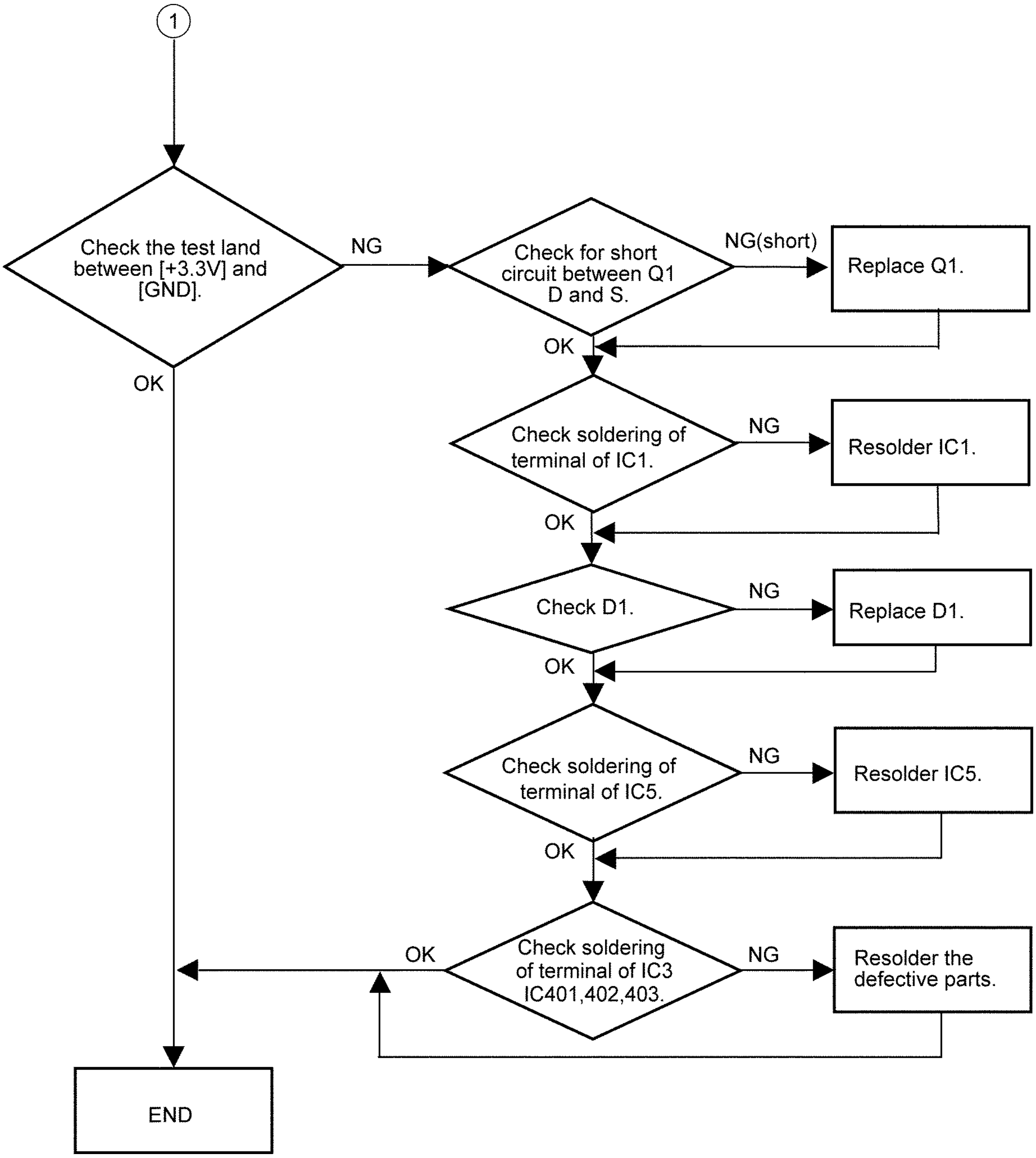
7.3.1. Power Supply System

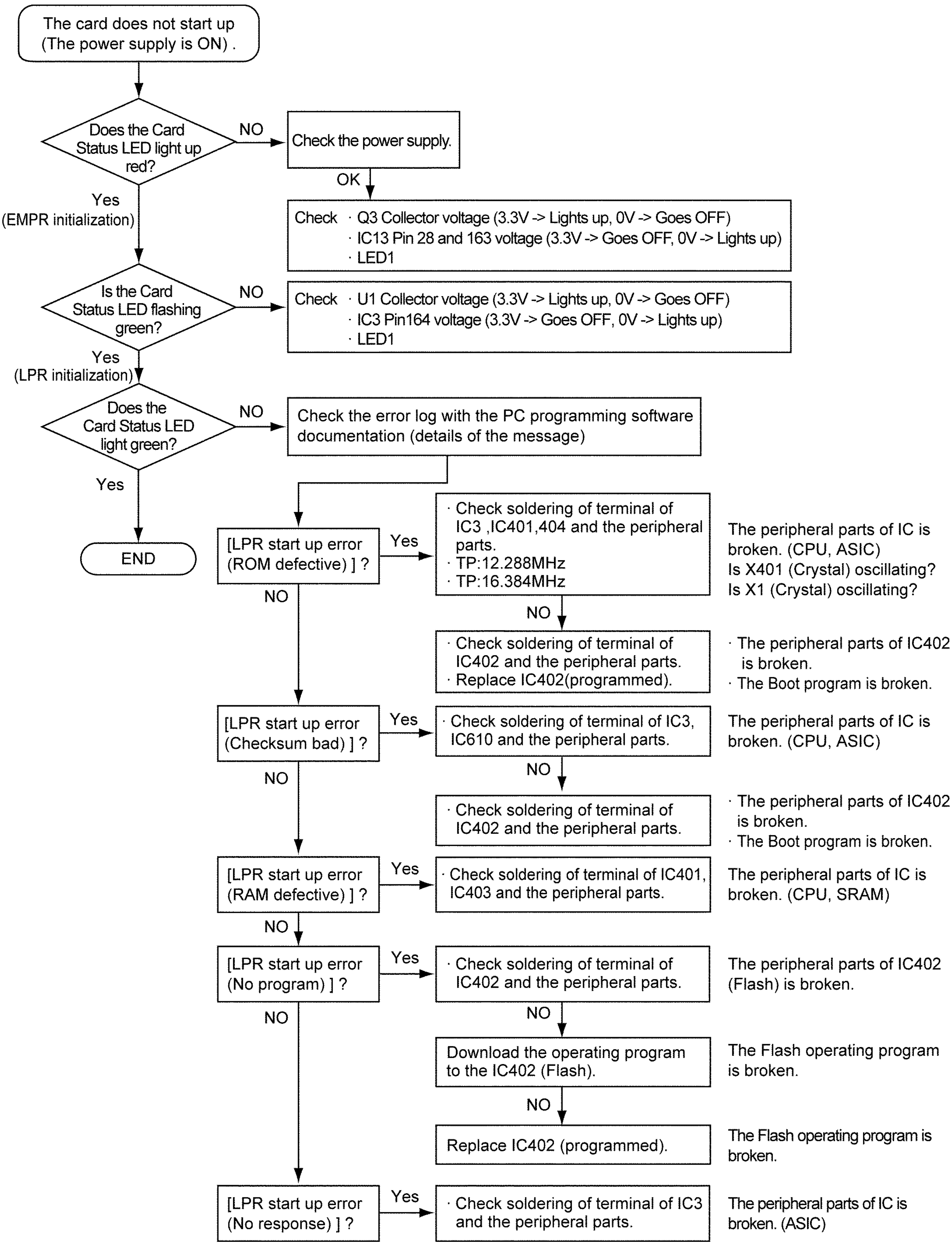
It provides four power systems; +15V power input and +5V, +3.3V power output.

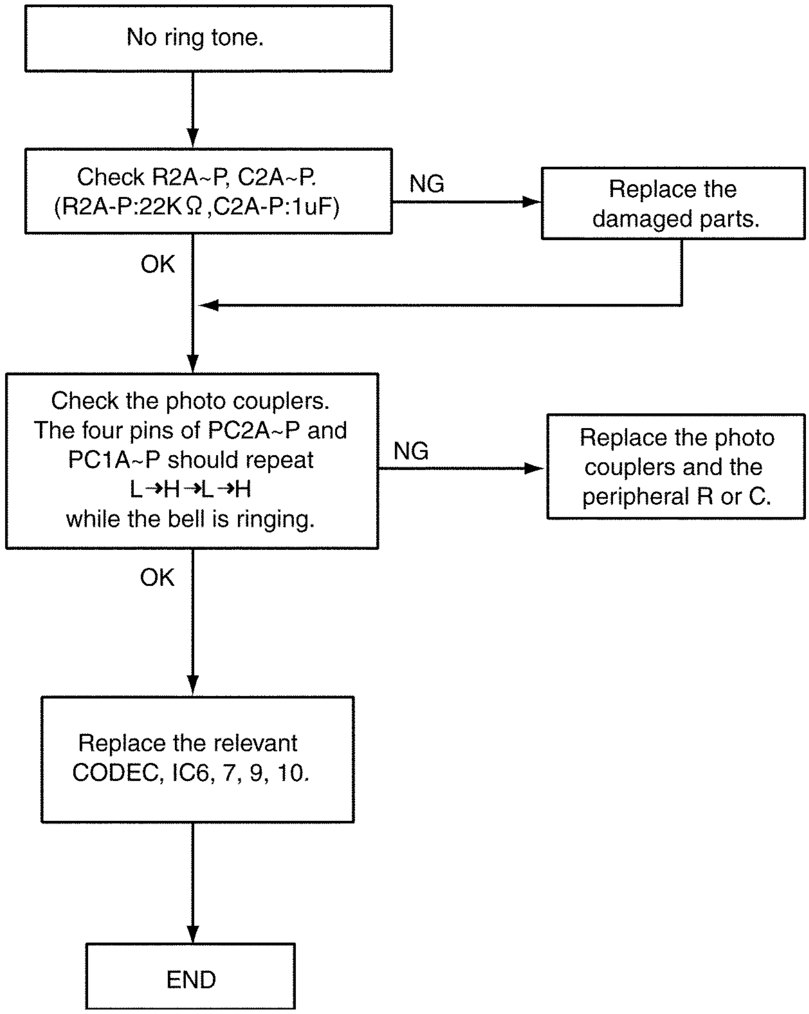


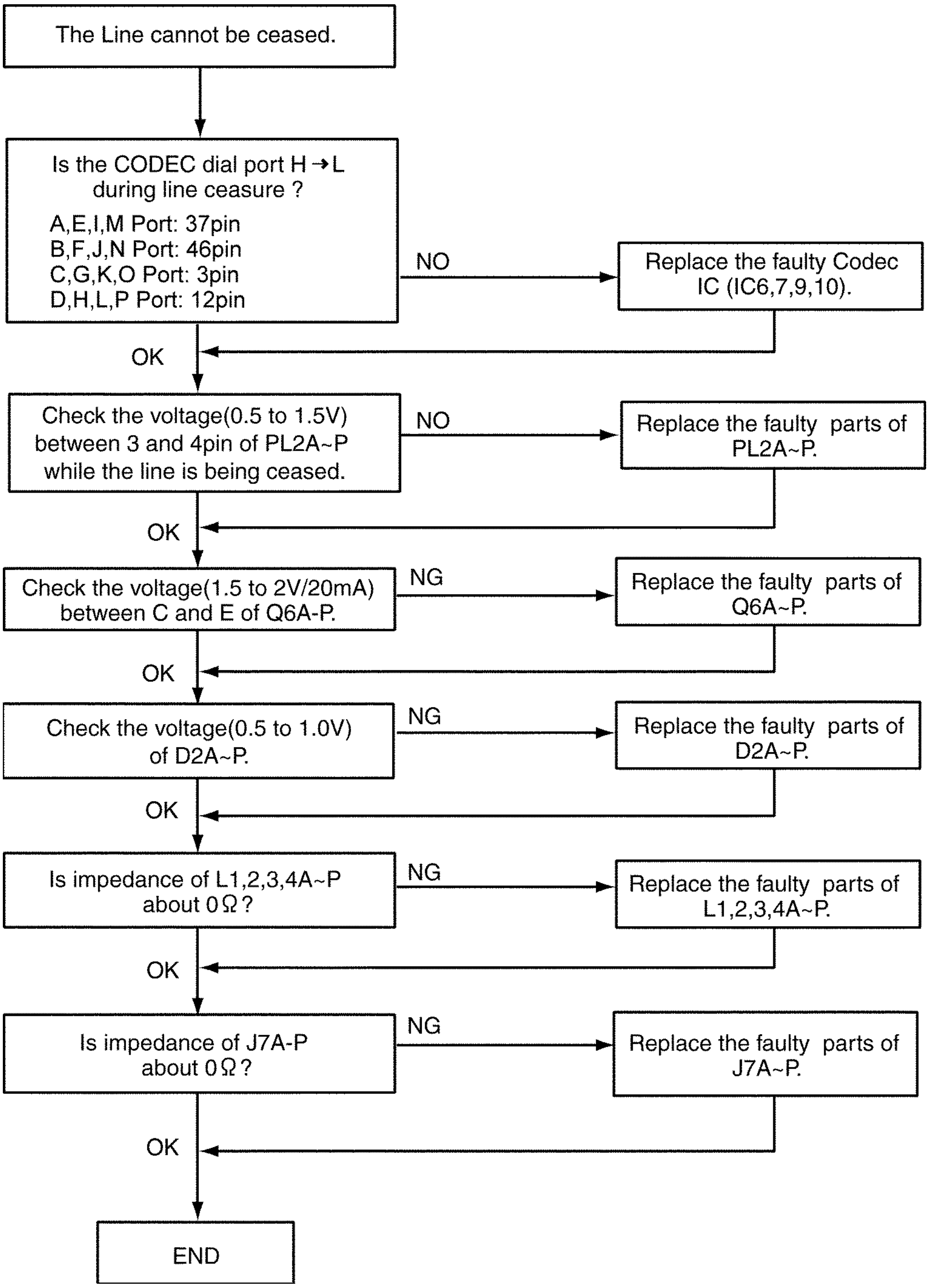
8 TROUBLESHOOTING GUIDE

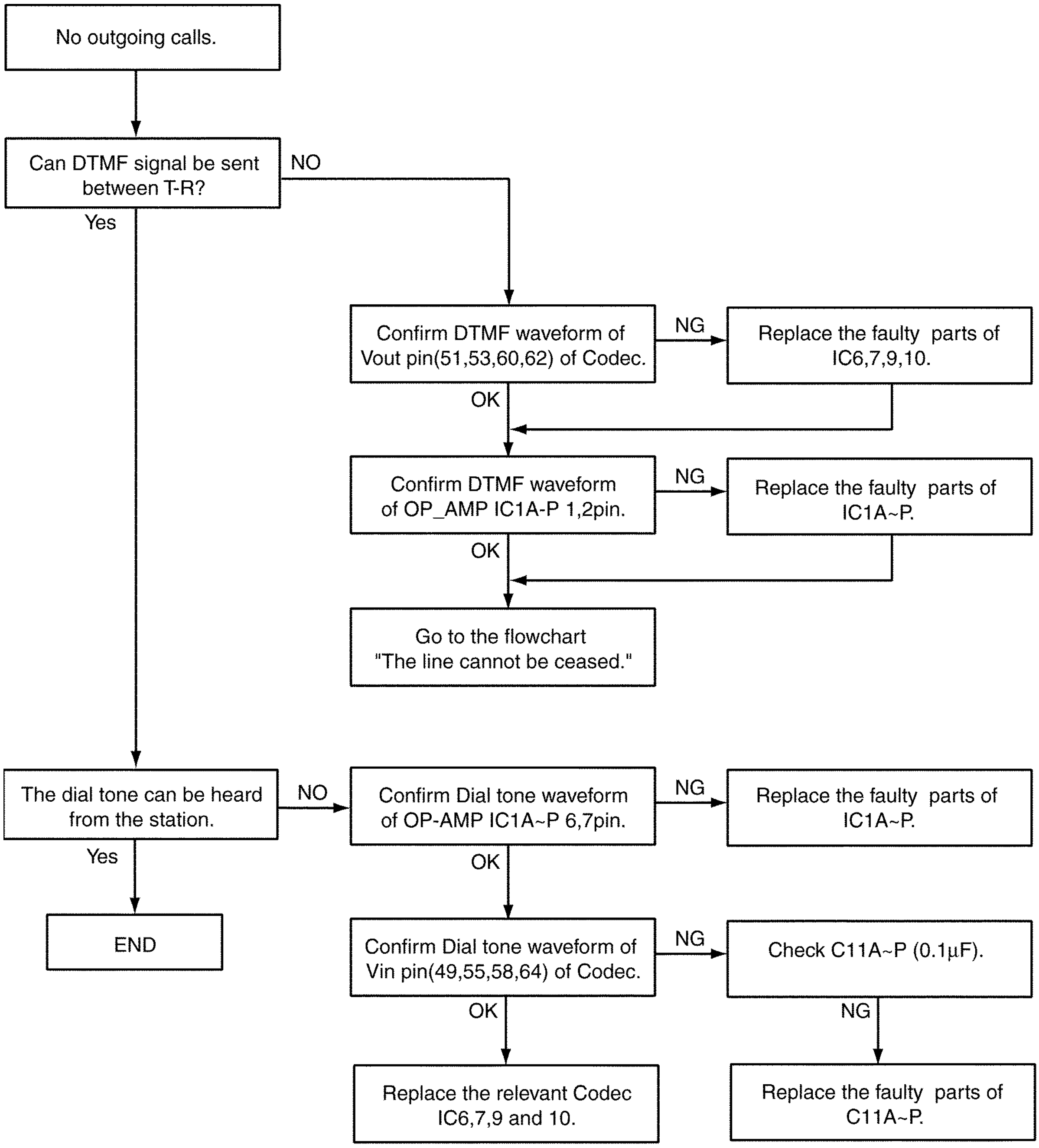



1
Check the test land between [+3.3V] and [GND].
NG
OK
Check for short circuit between Q1 D and S.
NG(short)
Replace Q1.
OK
Check soldering of terminal of IC1.
NG
Resolder IC1.
OK
Check D1.
NG
Replace D1.
OK
Check soldering of terminal of IC5.
NG
Resolder IC5.
OK
Check soldering of terminal of IC3 IC401,402,403.
OK
NG
Resolder the defective parts.
END


The card does not start up
(The power supply is ON) .
Does the Card Status LED light up red?
NO
Check the power supply.
OK
Check · Q3 Collector voltage (3.3V -> Lights up, 0V -> Goes OFF)
· IC13 Pin 28 and 163 voltage (3.3V -> Goes OFF, 0V -> Lights up)
· LED1
Yes
(EMPR initialization)
Is the Card Status LED flashing green?
NO
Check · U1 Collector voltage (3.3V -> Lights up, 0V -> Goes OFF)
· IC3 Pin164 voltage (3.3V -> Goes OFF, 0V -> Lights up)
· LED1
Yes
(LPR initialization)
Does the Card Status LED light green?
NO
Check the error log with the PC programming software documentation (details of the message)
Yes
END
[LPR start up error (ROM defective)] ?
Yes
· Check soldering of terminal of IC3 ,IC401,404 and the peripheral parts.
· TP:12.288MHz
· TP:16.384MHz
The peripheral parts of IC is broken. (CPU, ASIC)
Is X401 (Crystal) oscillating?
Is X1 (Crystal) oscillating?
NO
· Check soldering of terminal of IC402 and the peripheral parts.
· Replace IC402(programmed).
· The peripheral parts of IC402 is broken.
· The Boot program is broken.
NO
[LPR start up error (Checksum bad)] ?
Yes
· Check soldering of terminal of IC3, IC610 and the peripheral parts.
The peripheral parts of IC is broken. (CPU, ASIC)
NO
· Check soldering of terminal of IC402 and the peripheral parts.
· The peripheral parts of IC402 is broken.
· The Boot program is broken.
NO
[LPR start up error (RAM defective)] ?
Yes
· Check soldering of terminal of IC401, IC403 and the peripheral parts.
The peripheral parts of IC is broken. (CPU, SRAM)
NO
[LPR start up error (No program)] ?
Yes
· Check soldering of terminal of IC402 and the peripheral parts.
The peripheral parts of IC402 (Flash) is broken.
NO
Download the operating program to the IC402 (Flash).
The Flash operating program is broken.
NO
Replace IC402 (programmed).
The Flash operating program is broken.
NO
[LPR start up error (No response)] ?
Yes
· Check soldering of terminal of IC3 and the peripheral parts.
The peripheral parts of IC is broken. (ASIC)

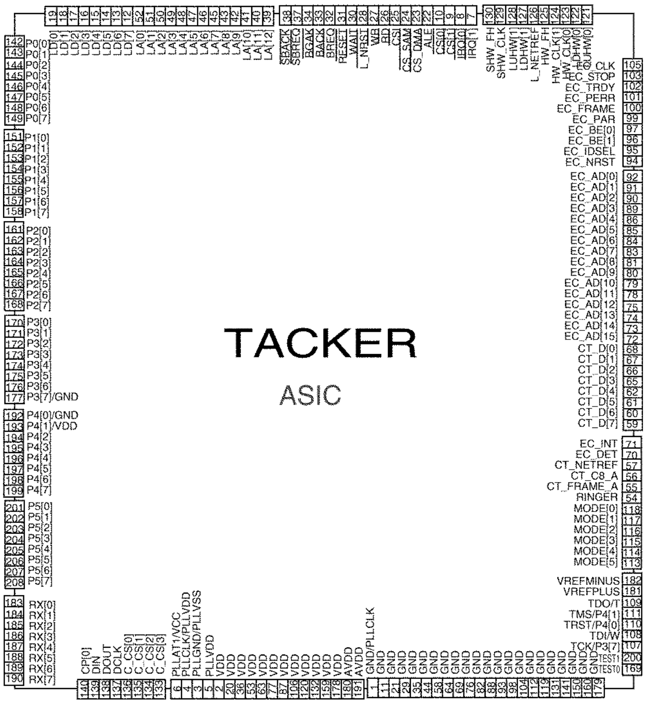

No ring tone.
Check R2A~P, C2A~P.
(R2A-P:22KΩ,C2A-P:1uF)
NG
Replace the damaged parts.
OK
Check the photo couplers.
The four pins of PC2A~P and PC1A~P should repeat
L→H→L→H
while the bell is ringing.
NG
Replace the photo couplers and the peripheral R or C.
OK
Replace the relevant CODEC, IC6, 7, 9, 10.
END


The Line cannot be ceased.
Is the CODEC dial port H → L during line ceasure ?
A,E,I,M Port: 37pin
B,F,J,N Port: 46pin
C,G,K,O Port: 3pin
D,H,L,P Port: 12pin
NO
Replace the faulty Codec IC (IC6,7,9,10).
OK
Check the voltage(0.5 to 1.5V) between 3 and 4pin of PL2A~P while the line is being ceased.
NO
Replace the faulty parts of PL2A~P.
OK
Check the voltage(1.5 to 2V/20mA) between C and E of Q6A-P.
NG
Replace the faulty parts of Q6A~P.
OK
Check the voltage(0.5 to 1.0V) of D2A~P.
NG
Replace the faulty parts of D2A~P.
OK
Is impedance of L1,2,3,4A~P about 0Ω?
NG
Replace the faulty parts of L1,2,3,4A~P.
OK
Is impedance of J7A-P about 0Ω?
NG
Replace the faulty parts of J7A~P.
OK
END


No outgoing calls.
Can DTMF signal be sent between T-R?
NO
Yes
Confirm DTMF waveform of Vout pin(51,53,60,62) of Codec.
NG
Replace the faulty parts of IC6,7,9,10.
OK
Confirm DTMF waveform of OP_AMP IC1A-P 1,2pin.
NG
Replace the faulty parts of IC1A~P.
OK
Go to the flowchart "The line cannot be ceased."
The dial tone can be heard from the station.
NO
Yes
END
Confirm Dial tone waveform of OP-AMP IC1A~P 6,7pin.
NG
Replace the faulty parts of IC1A~P.
OK
Confirm Dial tone waveform of Vin pin(49,55,58,64) of Codec.
NG
Check C11A~P (0.1µF).
OK
NG
Replace the relevant Codec IC6,7,9 and 10.
Replace the faulty parts of C11A~P.

9 IC DATA

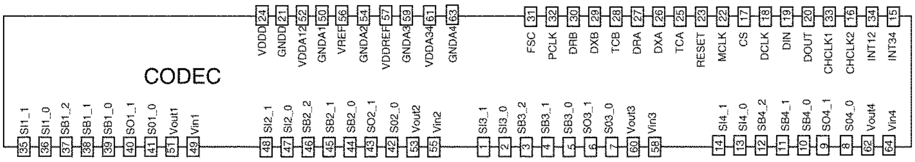
9.1. IC3 (ASIC)



Pin No.	Pin Name	Signal Name	I/O	ACT	Description
149	P07	OT_OE15	O	H	DTMF data output control signal
148	P06	OT_OE14	O	H	DTMF data output control signal
147	P05	OT_OE13	O	H	DTMF data output control signal
146	P04	OT_OE12	O	H	DTMF data output control signal
145	P03	OT_OE11	O	H	DTMF data output control signal
144	P02	OT_OE10	O	H	DTMF data output control signal
143	P01	OT_OE9	O	H	DTMF data output control signal
142	P00	OT_OE8	O	H	DTMF data output control signal
158	P17	VER5	I	L	RAM(H: 2Mbit, L: 1Mbit)
157	P16	VER4	I	H/L	Card recognition
156	P15	VER3	I	H/L	
155	P14	VER2	I	H/L	For Hard Version management Initial 0
154	P13	VER1	I	H/L	
153	P12	VER0	I	H/L	
152	P11	PORT1	I	H	Port Number 16
151	P10	PORT0	I	H	
168	P27		O	H	Reserve
167	P26		O	H	Reserve
166	P25		O	H	Reserve
165	P24		O	H	Reserve
164	P23	LED_G	O	L	LED Green ON
163	P22	LED_R	O	L	LED Red ON
162	P21	OPTION1	I	L	Option board 1 detection
161	P20	OPTION0	I	L	Option board 0 detection
107	P37		O	H	Reserve
176	P36		O	H	Reserve
175	P35		O	H	Reserve
174	P34		O	H	Reserve
173	P33		O	H	Reserve
172	P32		O	H	Reserve
171	P31		O	H	Reserve
170	P30		O	H	Reserve
199	P47	DT_OE7	O	H	DTMF data output control signal
198	P46	DT_OE6	O	H	DTMF data output control signal
197	P45	DT_OE5	O	H	DTMF data output control signal
196	P44	DT_OE4	O	H	DTMF data output control signal
195	P43	DT_OE3	O	H	DTMF data output control signal
194	P42	DT_OE2	O	H	DTMF data output control signal

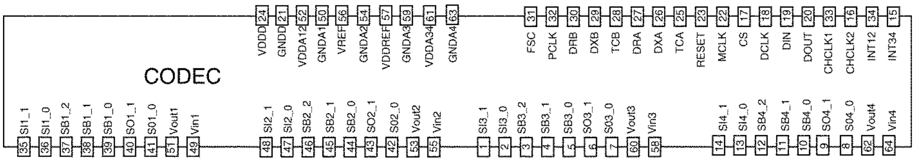
Pin No.	Pin Name	Signal Name	I/O	ACT	Description
111	P41	DT_OE1	O	H	DTMF data output control signal
110	P40	DT_OE0	O	H	DTMF data output control signal
208	P57		O	H	Reserve
207	P56		O	H	Reserve
206	P55		O	H	Reserve
205	P54		O	H	Reserve
204	P53		O	H	Reserve
203	P52		O	H	Reserve
202	P51		O	H	Reserve
201	P50		O	H	Reserve

9.2. IC6 (CODEC)



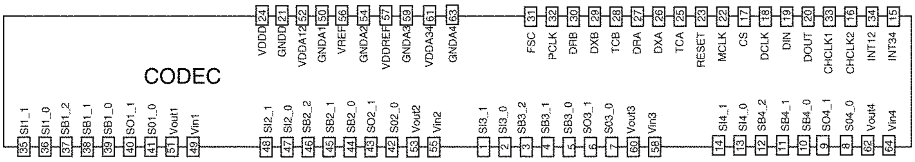
Line wire port	Pin No.	Pin Name	Signal Name	I/O	ACT	Description
CO1	40	SO1_1	SHNT0	O	L	Pulse Control/Bell Receive Control
	41	SO1_0	DIAG0	O	H	Self-Diagnosis Switching
	37	SB1_2	DIAL0	O	L	Line Acquisition
	38	SB1_1	BELLI0	I	L	Receiving Bell Signal
	39	SB1_0	REVDET0	I	H/L	Line Reversal Detection
	35	SI1_1	CPCDET0	I	H	Disconnect Detection
	36	SI1_0	DT_STD0	I	H	DTMF Detection
CO2	43	SO2_1	SHNT1	O	L	Pulse Control/Bell Receive Control
	42	SO2_0	DIAG1	O	H	Self-Diagnosis Switching
	46	SB2_2	DIAL1	O	L	Line Acquisition
	45	SB2_1	BELLI1	I	L	Receiving Bell Signal
	44	SB2_0	REVDET1	I	H/L	Line Reversal Detection
	48	SI2_1	CPCDET1	I	H	Disconnect Detection
	47	SI2_0	DT_STD1	I	H	DTMF Detection
CO3	6	SO3_1	SHNT2	O	L	Pulse Control/Bell Receive Control
	7	SO3_0	DIAG2	O	H	Self-Diagnosis Switching
	3	SB3_2	DIAL2	O	L	Line Acquisition
	4	SB3_1	BELLI2	I	L	Receiving Bell Signal
	5	SB3_0	REVDET2	I	H/L	Line Reversal Detection
	1	SI3_1	CPCDET2	I	H	Disconnect Detection
	2	SI3_0	DT_STD2	I	H	DTMF Detection
CO4	9	SO4_1	SHNT3	O	L	Pulse Control/Bell Receive Control
	8	SO4_0	DIAG3	O	H	Self-Diagnosis Switching
	12	SB4_2	DIAL3	O	L	Line Acquisition
	11	SB4_1	BELLI3	I	L	Receiving Bell Signal
	10	SB4_0	REVDET3	I	H/L	Line Reversal Detection
	14	SI4_1	CPCDET3	I	H	Disconnect Detection
	13	SI4_0	DT_STD3	I	H	DTMF Detection

9.3. IC7 (CODEC)



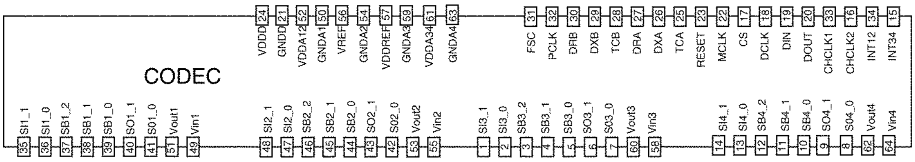
Line wire port	Pin No.	Pin Name	Signal Name	I/O	ACT	Description
CO5	40	SO1_1	SHNT4	O	L	Pulse Control/Bell Receive Control
	41	SO1_0	DIAG4	O	H	Self-Diagnosis Switching
	37	SB1_2	DIAL4	O	L	Line Acquisition
	38	SB1_1	BELLI4	I	L	Receiving Bell Signal
	39	SB1_0	REVDET4	I	H/L	Line Reversal Detection
	35	SI1_1	CPCDET4	I	H	Disconnect Detection
	36	SI1_0	DT_STD4	I	H	DTMF Detection
CO6	43	SO2_1	SHNT5	O	L	Pulse Control/Bell Receive Control
	42	SO2_0	DIAG5	O	H	Self-Diagnosis Switching
	46	SB2_2	DIAL5	O	L	Line Acquisition
	45	SB2_1	BELLI5	I	L	Receiving Bell Signal
	44	SB2_0	REVDET5	I	H/L	Line Reversal Detection
	48	SI2_1	CPCDET5	I	H	Disconnect Detection
	47	SI2_0	DT_STD5	I	H	DTMF Detection
CO7	6	SO3_1	SHNT6	O	L	Pulse Control/Bell Receive Control
	7	SO3_0	DIAG6	O	H	Self-Diagnosis Switching
	3	SB3_2	DIAL6	O	L	Line Acquisition
	4	SB3_1	BELLI6	I	L	Receiving Bell Signal
	5	SB3_0	REVDET6	I	H/L	Line Reversal Detection
	1	SI3_1	CPCDET6	I	H	Disconnect Detection
	2	SI3_0	DT_STD6	I	H	DTMF Detection
CO8	9	SO4_1	SHNT7	O	L	Pulse Control/Bell Receive Control
	8	SO4_0	DIAG7	O	H	Self-Diagnosis Switching
	12	SB4_2	DIAL7	O	L	Line Acquisition
	11	SB4_1	BELLI7	I	L	Receiving Bell Signal
	10	SB4_0	REVDET7	I	H/L	Line Reversal Detection
	14	SI4_1	CPCDET7	I	H	Disconnect Detection
	13	SI4_0	DT_STD7	I	H	DTMF Detection

9.4. IC9 (CODEC)



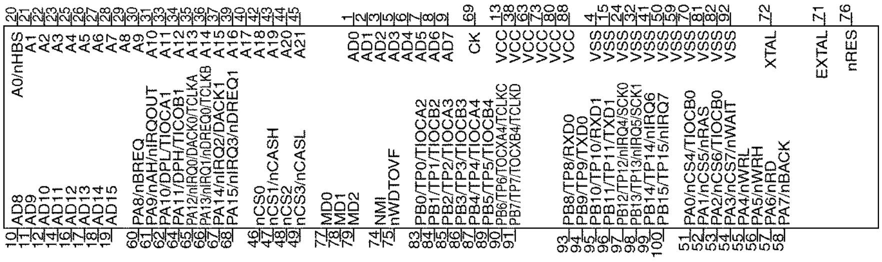
Line wire port	Pin No.	Pin Name	Signal Name	I/O	ACT	Description
CO9	40	SO1_1	SHNT8	O	L	Pulse Control/Bell Receive Control
	41	SO1_0	DIAG8	O	H	Self-Diagnosis Switching
	37	SB1_2	DIAL8	O	L	Line Acquisition
	38	SB1_1	BELLI8	I	L	Receiving Bell Signal
	39	SB1_0	REVDET8	I	H/L	Line Reversal Detection
	35	SI1_1	CPCDET8	I	H	Disconnect Detection
	36	SI1_0	DT_STD8	I	H	DTMF Detection
CO10	43	SO2_1	SHNT9	O	L	Pulse Control/Bell Receive Control
	42	SO2_0	DIAG9	O	H	Self-Diagnosis Switching
	46	SB2_2	DIAL9	O	L	Line Acquisition
	45	SB2_1	BELLI9	I	L	Receiving Bell Signal
	44	SB2_0	REVDET9	I	H/L	Line Reversal Detection
	48	SI2_1	CPCDET9	I	H	Disconnect Detection
	47	SI2_0	DT_STD9	I	H	DTMF Detection
CO11	6	SO3_1	SHNT10	O	L	Pulse Control/Bell Receive Control
	7	SO3_0	DIAG10	O	H	Self-Diagnosis Switching
	3	SB3_2	DIAL10	O	L	Line Acquisition
	4	SB3_1	BELLI10	I	L	Receiving Bell Signal
	5	SB3_0	REVDET10	I	H/L	Line Reversal Detection
	1	SI3_1	CPCDET10	I	H	Disconnect Detection
	2	SI3_0	DT_STD10	I	H	DTMF Detection
CO12	9	SO4_1	SHNT11	O	L	Pulse Control/Bell Receive Control
	8	SO4_0	DIAG11	O	H	Self-Diagnosis Switching
	12	SB4_2	DIAL11	O	L	Line Acquisition
	11	SB4_1	BELLI11	I	L	Receiving Bell Signal
	10	SB4_0	REVDET11	I	H/L	Line Reversal Detection
	14	SI4_1	CPCDET11	I	H	Disconnect Detection
	13	SI4_0	DT_STD11	I	H	DTMF Detection

9.5. IC10 (CODEC)



Line wire port	Pin No.	Pin Name	Signal Name	I/O	ACT	Description
CO13	40	SO1_1	SHNT12	O	L	Pulse Control/Bell Receive Control
	41	SO1_0	DIAG12	O	H	Self-Diagnosis Switching
	37	SB1_2	DIAL12	O	L	Line Acquisition
	38	SB1_1	BELLI12	I	L	Receiving Bell Signal
	39	SB1_0	REVDET12	I	H/L	Line Reversal Detection
	35	SI1_1	CPCDET12	I	H	Disconnect Detection
	36	SI1_0	DT_STD12	I	H	DTMF Detection
CO14	43	SO2_1	SHNT13	O	L	Pulse Control/Bell Receive Control
	42	SO2_0	DIAG13	O	H	Self-Diagnosis Switching
	46	SB2_2	DIAL13	O	L	Line Acquisition
	45	SB2_1	BELLI13	I	L	Receiving Bell Signal
	44	SB2_0	REVDET13	I	H/L	Line Reversal Detection
	48	SI2_1	CPCDET13	I	H	Disconnect Detection
	47	SI2_0	DT_STD13	I	H	DTMF Detection
CO15	6	SO3_1	SHNT14	O	L	Pulse Control/Bell Receive Control
	7	SO3_0	DIAG14	O	H	Self-Diagnosis Switching
	3	SB3_2	DIAL14	O	L	Line Acquisition
	4	SB3_1	BELLI14	I	L	Receiving Bell Signal
	5	SB3_0	REVDET14	I	H/L	Line Reversal Detection
	1	SI3_1	CPCDET14	I	H	Disconnect Detection
	2	SI3_0	DT_STD14	I	H	DTMF Detection
CO16	9	SO4_1	SHNT15	O	L	Pulse Control/Bell Receive Control
	8	SO4_0	DIAG15	O	H	Self-Diagnosis Switching
	12	SB4_2	DIAL15	O	L	Line Acquisition
	11	SB4_1	BELLI15	I	L	Receiving Bell Signal
	10	SB4_0	REVDET15	I	H/L	Line Reversal Detection
	14	SI4_1	CPCDET15	I	H	Disconnect Detection
	13	SI4_0	DT_STD15	I	H	DTMF Detection

9.6. IC601 (CPU) I/O MAP



Pin No.	Pin name	Signal name	I/O	ACT	Description	Remarks
68	PA15					
67	PA14					
66	PA13	nIRQ1	I	L	EMPR interrupt	Used as nIRQ1
65	PA12	HALT	I	H	DC power down recovery detection	Used as nIRQ0
64	PA11	nRTS	O	L	Serial I/F for debug	
62	PA10	nCTS	I	L	Serial I/F for debug	
61	PA9		O	H	Not used	
60	PA8	nBREQ	I	L	Bus request from EMPR	Used as nBREQ
58	PA7	nBACK	O	L	Response to bus request from EMPR	Used as nBACK
57	PA6	nRD	O	L	Read signal	Used as nRD
56	PA5		O	H	Not used	
55	PA4	nWR	O	L	Write signal	Used as nWR
54	PA3	nWAIT	I	L	Wait signal	Used as nWAIT
53	PA2		O		Not used	
52	PA1		O		Not used	
51	PA0		O		Not used	
100	PB15		O		Not used	
99	PB14		O		Not used	
98	PB13		O		Not used	
97	PB12		O		Not used	
96	PB11		I		Not used	
95	PB10		O		Not used	
94	PB9	TX			Serial I/F for debug	Used as TXD0
93	PB8	RX			Serial I/F for debug	Used as RXD0
91	PB7	BID2	I	L	Board classification judgment (Use undecided)	
90	PB6	BID1	I	L	Board classification judgment (Use undecided)	
89	PB5	BID0	I	L	Board classification judgment (Use undecided)	
87	PB4	PB4	I	H	H: Operation, L: Debug	
86	PB3	nFlash Busy	I	L	Flash Memory Busy	
85	PB2		O		Not used	
84	PB1		O		Not used	
83	PB0		O		Not used	

10 HOW TO REPLACE A FLAT PACKAGE IC

Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

10.1. PREPARATION

- PbF (: Pb free) Solder
- Soldering Iron

  Tip Temperature of 700°F ± 20°F (370°C ± 10°C)

  Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Flux

  Recommended Flux: Specific Gravity → 0.82.

  Type → RMA (lower residue, non-cleaning type)

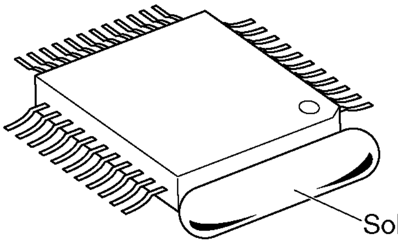
  Note: See **ABOUT LEAD FREE SOLDER (PbF: Pb free)** (P.3).

10.2. REMOVAL PROCEDURE

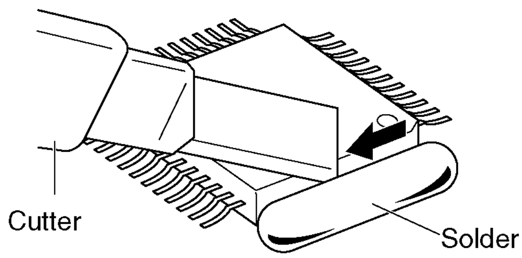
1. Put plenty of solder on the IC pins so that the pins can be completely covered.

   Note:

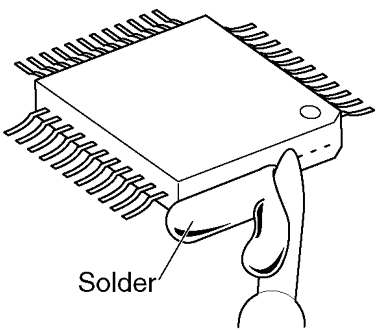
   If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



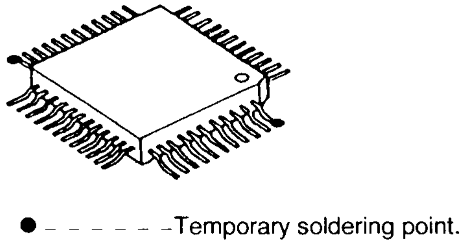
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

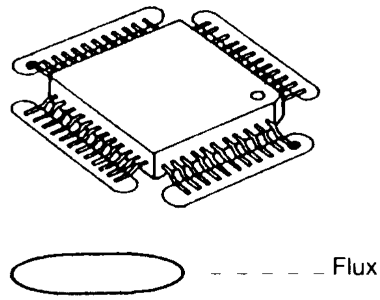
10.3. INSTALLATION PROCEDURE

1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.

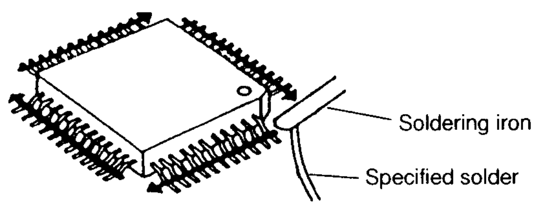


   Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.

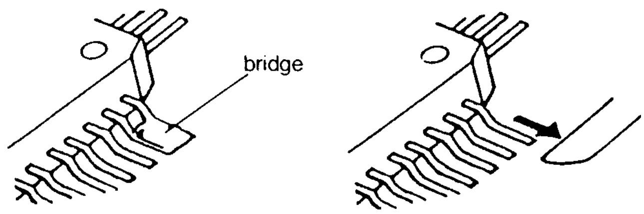


3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.

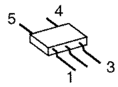
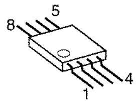
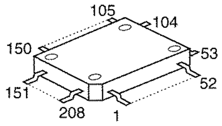
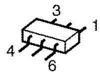
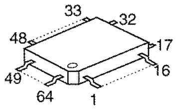
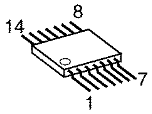
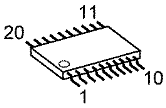
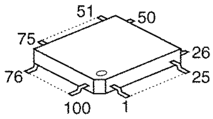
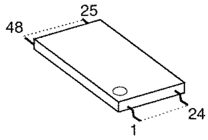
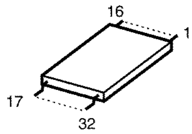
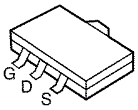
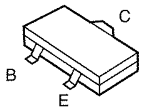
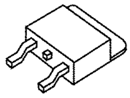
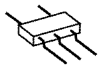
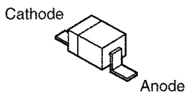
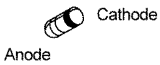
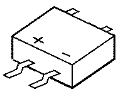
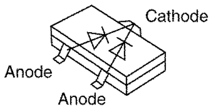
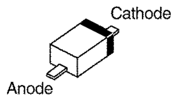
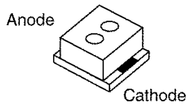


10.4. REMOVING SOLDER FROM BETWEEN PINS

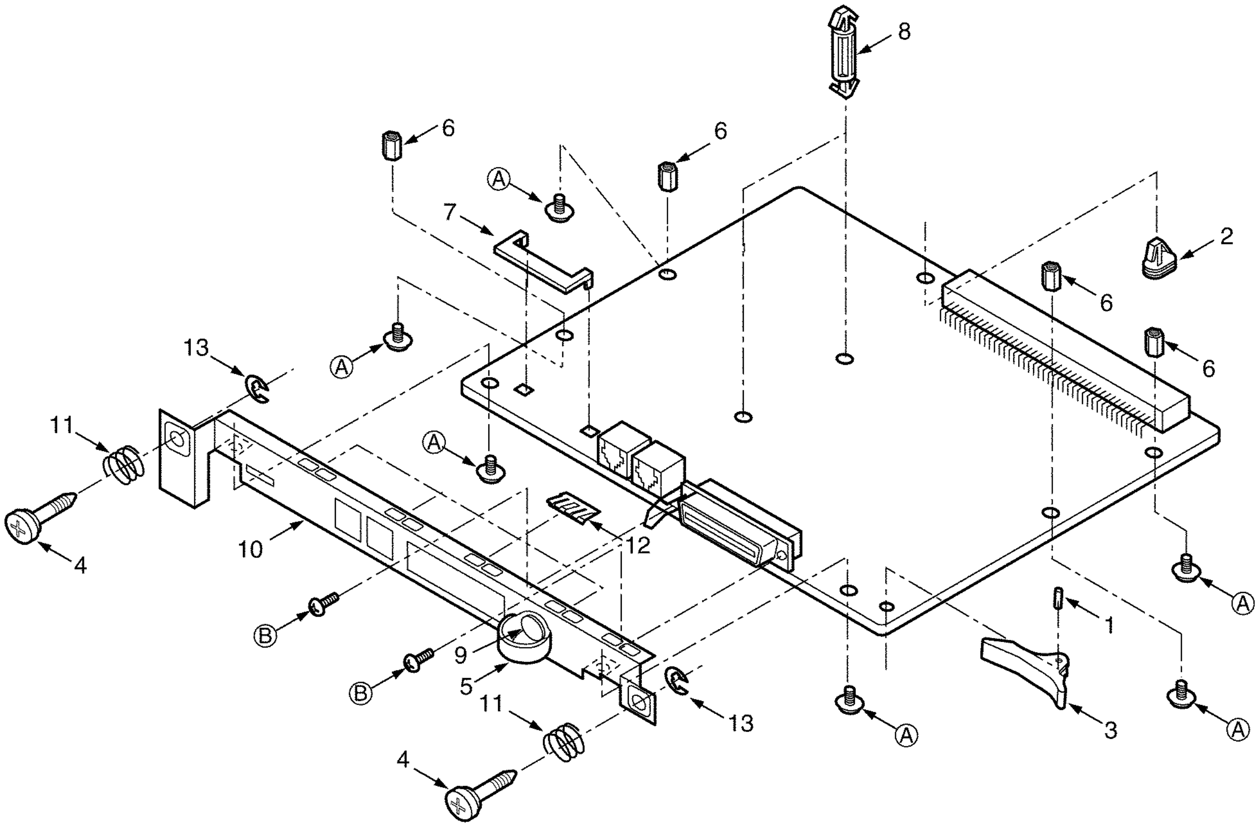
1. Add a small amount of solder to the bridged pins.
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.



11 TERMINAL GUIDE OF ICs, TRANSISTORS AND DIODES

 C0DBAGZ00029 C0DBAHZ00012	 C0ABBB000179 C0JBAB000535 C1CB00001775	 C1CB00001396	 PSVIPST596CN	 C1CB00001432
 C0ABCB000038	 PSVINLV273A	 C2CBYE000011	 PSWITDA6181X	 C3BBHC000368
 B1DHCD000018 B1DFDC000002	 B1CHKD000001 PQVTDTA114EU B1GBCFGG0009 PQVTDTC114YU	 B1BBDL000007	 B1GHCFJJ0007	 B0JCND000009 MA8051 MA8075
 PQVDRLZ2R0B	 B0EDKT000007	 MA3S13300L	 1SS355	 PQVDBRPY1204

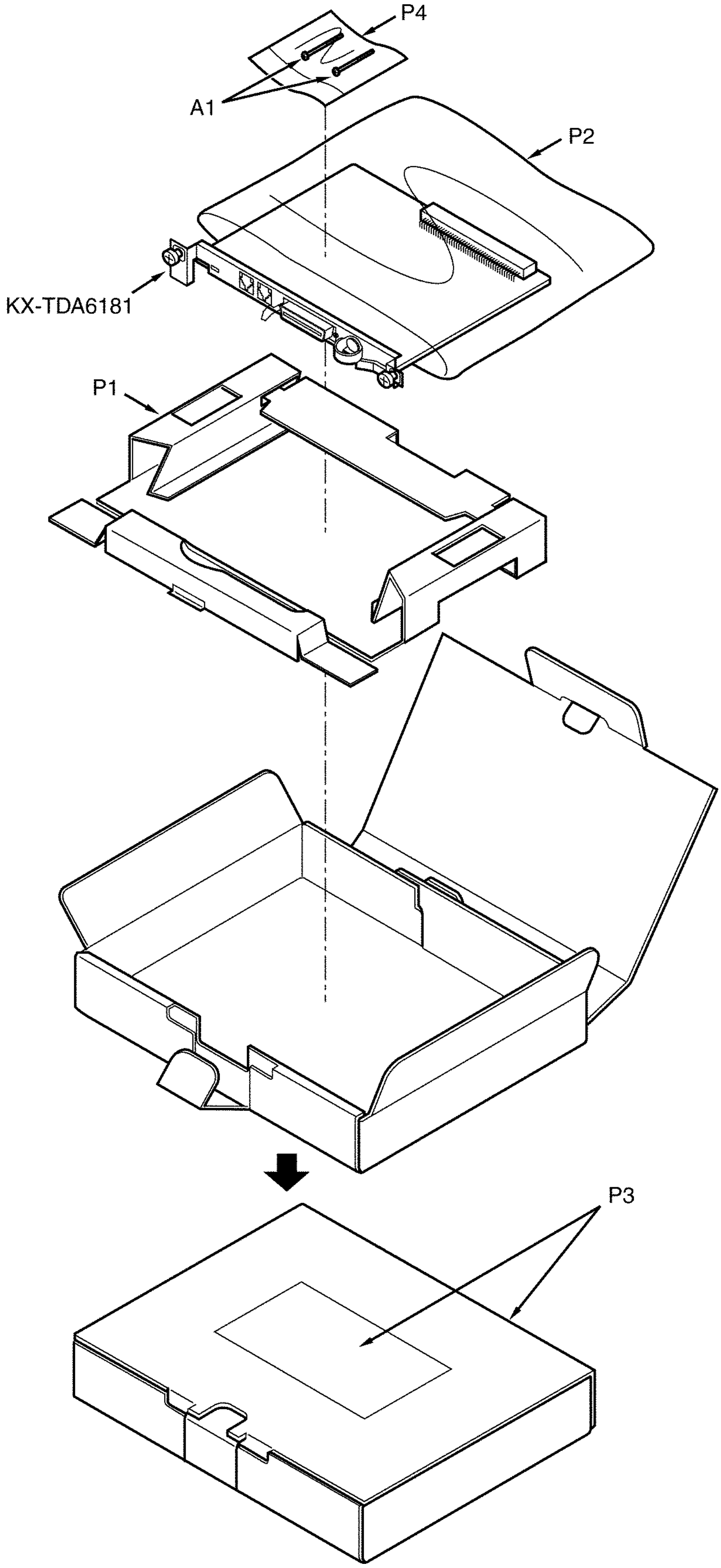
12 CABINET AND ELECTRICAL PARTS LOCATION



SCREW

Ref. No.	Part No.	Screw
A	XYN3+F6FJ	Φ 3 x 6 mm
B	XSN4X40+6FN	Φ 2.8 x 6 mm

13 ACCESSORIES AND PACKING MATERIAL



14 REPLACEMENT PARTS LIST

1. RTL (Retention Time Limited)

   The marking (RTL) indicates that the Retention Time is limited for this item.

   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention. At the end of this period, the assembly will no longer be available.
2. Important safety notice

   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture´s parts.
3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.
4. ISO code (Example: ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.
5. RESISTORS & CAPACITORS

   Unless otherwise specified;

   All resistors are in ohms (Ω), k=1000Ω, M=1000kΩ

   All capacitors are in MICRO FARADS (μF), p=μ(μF)

   *Type & Wattage of Resistor

Type

ERC:Solid ERD:Carbon PQRD:Carbon	ERX:Metal Film ERG:Metal Oxide ER0:Metal Film	PQ4R:Carbon ERS:Fusible Resistor ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol PQCUV:Chip ECQMS:Mica	ECCD,ECKD,ECBT,PQCBC:Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECSZ:Electrolytic ECQP:Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :63V 2A :100V

14.1. CABINET AND ELECTRICAL PARTS LOCATION

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQDF996Z	SHAFT	
2	PQHR10005Z	SPACER	
3	PQUB14Z2	LEVER, EJECTOR	
4	PSHD1088Z	SCREW	
5	PSHE1106Z	TAPE	
6	PSHE1123Z	SPACER	
7	PSHR1238Z	SPACER, PANEL LIGHT	
8	PSHR1258Z	SPACER	
9	PSHR1272Z	REVET	
10	PSMH1212W	PANEL, FRONT	
11	PSUS1020Z	TORSION SPRING	
12	PSUS1021Y	TORSION SPRING	
13	XUC25VW	RETAINING RING	

14.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	XSN4X40+28FK	SCREW	
P1	PSPD1188X	CUSHION	
P2	PSPP1069Z	PROTECTION COVER	
P3	PSZKTDA6181X	GIFT BOX	
P4	XZB05X08A03	PROTECTION COVER	

14.3. MAIN BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
		(ICS)	
IC1	C0DBAGZ00029	IC	
IC1A	C0ABBB000179	IC	
IC1B	C0ABBB000179	IC	
IC1C	C0ABBB000179	IC	
IC1D	C0ABBB000179	IC	
IC1E	C0ABBB000179	IC	
IC1F	C0ABBB000179	IC	
IC1G	C0ABBB000179	IC	
IC1H	C0ABBB000179	IC	
IC1I	C0ABBB000179	IC	
IC1J	C0ABBB000179	IC	
IC1K	C0ABBB000179	IC	
IC1L	C0ABBB000179	IC	
IC1M	C0ABBB000179	IC	
IC1N	C0ABBB000179	IC	
IC1O	C0ABBB000179	IC	
IC1P	C0ABBB000179	IC	
IC2	C0DBAHZ00012	IC	
IC3	C1CB00001396	IC	
IC4	PSVIPST596CN	IC	
IC5	C0JBAB000535	IC	
IC6	C1CB00001432	IC	
IC7	C1CB00001432	IC	
IC8	C0ABCB000038	IC	
IC9	C1CB00001432	IC	
IC10	C1CB00001432	IC	
IC11	C0ABCB000038	IC	
IC12	C0ABCB000038	IC	
IC13	C0ABCB000038	IC	
IC20	PSVISNLV273A	IC	S
IC401	C2CBYE000011	IC	
IC402	PSWITDA6181X	IC	
IC403	C3BBHC000368	IC	
IC404	C1CB00001775	IC	
		(TRANSISTORS)	
Q1	B1DHCD000018	TRANSISTOR(SI)	
Q2	B1CHKD000001	TRANSISTOR(SI)	
Q3	PQVTDTA114EU	TRANSISTOR(SI)	S
Q6	B1DFDC000002	TRANSISTOR(SI)	
Q6A	B1BBDL000007	TRANSISTOR(SI)	
Q6B	B1BBDL000007	TRANSISTOR(SI)	
Q6C	B1BBDL000007	TRANSISTOR(SI)	
Q6D	B1BBDL000007	TRANSISTOR(SI)	
Q6E	B1BBDL000007	TRANSISTOR(SI)	
Q6F	B1BBDL000007	TRANSISTOR(SI)	
Q6G	B1BBDL000007	TRANSISTOR(SI)	
Q6H	B1BBDL000007	TRANSISTOR(SI)	
Q6I	B1BBDL000007	TRANSISTOR(SI)	
Q6J	B1BBDL000007	TRANSISTOR(SI)	
Q6K	B1BBDL000007	TRANSISTOR(SI)	

Ref. No.	Part No.	Part Name & Description	Remarks
Q6L	B1BBDL000007	TRANSISTOR(SI)	
Q6M	B1BBDL000007	TRANSISTOR(SI)	
Q6N	B1BBDL000007	TRANSISTOR(SI)	
Q6O	B1BBDL000007	TRANSISTOR(SI)	
Q6P	B1BBDL000007	TRANSISTOR(SI)	
Q7A	B1GBCFGG0009	TRANSISTOR(SI)	
Q7B	B1GBCFGG0009	TRANSISTOR(SI)	
Q7C	B1GBCFGG0009	TRANSISTOR(SI)	
Q7D	B1GBCFGG0009	TRANSISTOR(SI)	
Q7E	B1GBCFGG0009	TRANSISTOR(SI)	
Q7F	B1GBCFGG0009	TRANSISTOR(SI)	
Q7G	B1GBCFGG0009	TRANSISTOR(SI)	
Q7H	B1GBCFGG0009	TRANSISTOR(SI)	
Q7I	B1GBCFGG0009	TRANSISTOR(SI)	
Q7J	B1GBCFGG0009	TRANSISTOR(SI)	
Q7K	B1GBCFGG0009	TRANSISTOR(SI)	
Q7L	B1GBCFGG0009	TRANSISTOR(SI)	
Q7M	B1GBCFGG0009	TRANSISTOR(SI)	
Q7N	B1GBCFGG0009	TRANSISTOR(SI)	
Q7O	B1GBCFGG0009	TRANSISTOR(SI)	
Q7P	B1GBCFGG0009	TRANSISTOR(SI)	
Q401	PQVTDTC114YU	TRANSISTOR(SI)	S
U1	B1GHCFJJ0007	TRANSISTOR(SI)	S
		(DIODES)	
D1	B0JCND000009	DIODE(SI)	
D1A	PQVDRLZ2R0B	DIODE(SI)	S
D1B	PQVDRLZ2R0B	DIODE(SI)	S
D1C	PQVDRLZ2R0B	DIODE(SI)	S
D1D	PQVDRLZ2R0B	DIODE(SI)	S
D1E	PQVDRLZ2R0B	DIODE(SI)	S
D1F	PQVDRLZ2R0B	DIODE(SI)	S
D1G	PQVDRLZ2R0B	DIODE(SI)	S
D1H	PQVDRLZ2R0B	DIODE(SI)	S
D1I	PQVDRLZ2R0B	DIODE(SI)	S
D1J	PQVDRLZ2R0B	DIODE(SI)	S
D1K	PQVDRLZ2R0B	DIODE(SI)	S
D1L	PQVDRLZ2R0B	DIODE(SI)	S
D1M	PQVDRLZ2R0B	DIODE(SI)	S
D1N	PQVDRLZ2R0B	DIODE(SI)	S
D1O	PQVDRLZ2R0B	DIODE(SI)	S
D1P	PQVDRLZ2R0B	DIODE(SI)	S
D2	B0JCND000009	DIODE(SI)	
D2A	B0EDKT000007	DIODE(SI)	
D2B	B0EDKT000007	DIODE(SI)	
D2C	B0EDKT000007	DIODE(SI)	
D2D	B0EDKT000007	DIODE(SI)	
D2E	B0EDKT000007	DIODE(SI)	
D2F	B0EDKT000007	DIODE(SI)	
D2G	B0EDKT000007	DIODE(SI)	
D2H	B0EDKT000007	DIODE(SI)	
D2I	B0EDKT000007	DIODE(SI)	
D2J	B0EDKT000007	DIODE(SI)	
D2K	B0EDKT000007	DIODE(SI)	
D2L	B0EDKT000007	DIODE(SI)	
D2M	B0EDKT000007	DIODE(SI)	
D2N	B0EDKT000007	DIODE(SI)	
D2O	B0EDKT000007	DIODE(SI)	
D2P	B0EDKT000007	DIODE(SI)	
D3	MA8051	DIODE(SI)	S
D3A	PQVDRLZ2R0B	DIODE(SI)	S
D3B	PQVDRLZ2R0B	DIODE(SI)	S
D3C	PQVDRLZ2R0B	DIODE(SI)	S
D3D	PQVDRLZ2R0B	DIODE(SI)	S
D3E	PQVDRLZ2R0B	DIODE(SI)	S
D3F	PQVDRLZ2R0B	DIODE(SI)	S
D3G	PQVDRLZ2R0B	DIODE(SI)	S
D3H	PQVDRLZ2R0B	DIODE(SI)	S
D3I	PQVDRLZ2R0B	DIODE(SI)	S
D3J	PQVDRLZ2R0B	DIODE(SI)	S
D3K	PQVDRLZ2R0B	DIODE(SI)	S
D3L	PQVDRLZ2R0B	DIODE(SI)	S
D3M	PQVDRLZ2R0B	DIODE(SI)	S
D3N	PQVDRLZ2R0B	DIODE(SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
D3O	PQVDRLZ2R0B	DIODE(SI)	S
D3P	PQVDRLZ2R0B	DIODE(SI)	S
D4	MA8075	DIODE(SI)	S
D4A	PQVDRLZ2R0B	DIODE(SI)	S
D4B	PQVDRLZ2R0B	DIODE(SI)	S
D4C	PQVDRLZ2R0B	DIODE(SI)	S
D4D	PQVDRLZ2R0B	DIODE(SI)	S
D4E	PQVDRLZ2R0B	DIODE(SI)	S
D4F	PQVDRLZ2R0B	DIODE(SI)	S
D4G	PQVDRLZ2R0B	DIODE(SI)	S
D4H	PQVDRLZ2R0B	DIODE(SI)	S
D4I	PQVDRLZ2R0B	DIODE(SI)	S
D4J	PQVDRLZ2R0B	DIODE(SI)	S
D4K	PQVDRLZ2R0B	DIODE(SI)	S
D4L	PQVDRLZ2R0B	DIODE(SI)	S
D4M	PQVDRLZ2R0B	DIODE(SI)	S
D4N	PQVDRLZ2R0B	DIODE(SI)	S
D4O	PQVDRLZ2R0B	DIODE(SI)	S
D4P	PQVDRLZ2R0B	DIODE(SI)	S
D5A	MA3S13300L	DIODE(SI)	
D5B	MA3S13300L	DIODE(SI)	
D5C	MA3S13300L	DIODE(SI)	
D5D	MA3S13300L	DIODE(SI)	
D5E	MA3S13300L	DIODE(SI)	
D5F	MA3S13300L	DIODE(SI)	
D5G	MA3S13300L	DIODE(SI)	
D5H	MA3S13300L	DIODE(SI)	
D5I	MA3S13300L	DIODE(SI)	
D5J	MA3S13300L	DIODE(SI)	
D5K	MA3S13300L	DIODE(SI)	
D5L	MA3S13300L	DIODE(SI)	
D5M	MA3S13300L	DIODE(SI)	
D5N	MA3S13300L	DIODE(SI)	
D5O	MA3S13300L	DIODE(SI)	
D5P	MA3S13300L	DIODE(SI)	
D8A	1SS355	DIODE(SI)	S
D8B	1SS355	DIODE(SI)	S
D8C	1SS355	DIODE(SI)	S
D8D	1SS355	DIODE(SI)	S
D8E	1SS355	DIODE(SI)	S
D8F	1SS355	DIODE(SI)	S
D8G	1SS355	DIODE(SI)	S
D8H	1SS355	DIODE(SI)	S
D8I	1SS355	DIODE(SI)	S
D8J	1SS355	DIODE(SI)	S
D8K	1SS355	DIODE(SI)	S
D8L	1SS355	DIODE(SI)	S
D8M	1SS355	DIODE(SI)	S
D8N	1SS355	DIODE(SI)	S
D8O	1SS355	DIODE(SI)	S
D8P	1SS355	DIODE(SI)	S
LED1	PQVDBRPY1204	LED	S
		(CONNECTORS)	
CN1	K1KA90B00009	CONNECTOR, 90P	
CN2	K1FB150B0046	CONNECTOR, 150P	
CN5	K1KB40A00165	CONNECTOR, 40P	
CN6	K1KB40A00165	CONNECTOR, 40P	
CN7	K1KB40A00165	CONNECTOR, 40P	
CN8	K1KB40A00165	CONNECTOR, 40P	
		(COMPONENTS PARTS)	
RA1	D1H81034A024	RESISTOR ARRAY, 10K	
RA1A	D1H86814A024	RESISTOR ARRAY, 680	
RA1B	D1H86814A024	RESISTOR ARRAY, 680	
RA1C	D1H86814A024	RESISTOR ARRAY, 680	
RA1D	D1H86814A024	RESISTOR ARRAY, 680	
RA1E	D1H86814A024	RESISTOR ARRAY, 680	
RA1F	D1H86814A024	RESISTOR ARRAY, 680	
RA1G	D1H86814A024	RESISTOR ARRAY, 680	
RA1H	D1H86814A024	RESISTOR ARRAY, 680	
RA1I	D1H86814A024	RESISTOR ARRAY, 680	
RA1J	D1H86814A024	RESISTOR ARRAY, 680	
RA1K	D1H86814A024	RESISTOR ARRAY, 680	
RA1L	D1H86814A024	RESISTOR ARRAY, 680	

Ref. No.	Part No.	Part Name & Description	Remarks
RA1M	D1H86814A024	RESISTOR ARRAY, 680	
RA1N	D1H86814A024	RESISTOR ARRAY, 680	
RA1O	D1H86814A024	RESISTOR ARRAY, 680	
RA1P	D1H86814A024	RESISTOR ARRAY, 680	
RA2	D1H81034A024	RESISTOR ARRAY, 10K	
RA3	D1H81034A024	RESISTOR ARRAY, 10K	
RA4	D1H81034A024	RESISTOR ARRAY, 10K	
RA5	D1H81034A024	RESISTOR ARRAY, 10K	
RA6	D1H81034A024	RESISTOR ARRAY, 10K	
RA7	D1H81034A024	RESISTOR ARRAY, 10K	
RA8	D1H81034A024	RESISTOR ARRAY, 10K	
RA9	D1H81034A024	RESISTOR ARRAY, 10K	
RA10	D1H81034A024	RESISTOR ARRAY, 10K	
RA11	D1H81034A024	RESISTOR ARRAY, 10K	
RA12	D1H81034A024	RESISTOR ARRAY, 10K	
RA13	D1H81034A024	RESISTOR ARRAY, 10K	
RA14	D1H81034A024	RESISTOR ARRAY, 10K	
RA15	D1H81034A024	RESISTOR ARRAY, 10K	
RA16	D1H81034A024	RESISTOR ARRAY, 10K	
RA17	D1H81034A024	RESISTOR ARRAY, 10K	
RA18	D1H81014A024	RESISTOR ARRAY, 100	
RA19	D1H81034A024	RESISTOR ARRAY, 10K	
RA20	D1H81034A024	RESISTOR ARRAY, 10K	
RA21	D1H84704A024	RESISTOR ARRAY, 47	
RA22	D1H84704A024	RESISTOR ARRAY, 47	
RA23	D1H84704A024	RESISTOR ARRAY, 47	
RA24	D1H84704A024	RESISTOR ARRAY, 47	
RA25	D1H84704A024	RESISTOR ARRAY, 47	
RA26	D1H84704A024	RESISTOR ARRAY, 47	
RA27	D1H81034A024	RESISTOR ARRAY, 10K	
RA28	D1H84704A024	RESISTOR ARRAY, 47	
RA29	D1H84704A024	RESISTOR ARRAY, 47	
RA30	D1H81024A024	RESISTOR ARRAY, 1K	
RA40	D1H88204A024	RESISTOR ARRAY, 82	
RA401	D1H81034A024	RESISTOR ARRAY, 10K	
RA402	D1H81034A024	RESISTOR ARRAY, 10K	
RA403	D1H81034A024	RESISTOR ARRAY, 10K	
RA404	D1H81034A024	RESISTOR ARRAY, 10K	
RA405	D1H86804A024	RESISTOR ARRAY, 68	
RA406	D1H86804A024	RESISTOR ARRAY, 68	
RA407	D1H86804A024	RESISTOR ARRAY, 68	
RA408	D1H86804A024	RESISTOR ARRAY, 68	
RA409	D1H81034A024	RESISTOR ARRAY, 10K	
RA410	D1H81024A024	RESISTOR ARRAY, 1K	
RA411	D1H81024A024	RESISTOR ARRAY, 1K	
RA412	D1H81024A024	RESISTOR ARRAY, 1K	
RA413	D1H81024A024	RESISTOR ARRAY, 1K	
RA414	D1H81034A024	RESISTOR ARRAY, 10K	
RA415	D1H81034A024	RESISTOR ARRAY, 10K	
RA416	D1H81034A024	RESISTOR ARRAY, 10K	
RA417	D1H81034A024	RESISTOR ARRAY, 10K	
RA418	D1H81034A024	RESISTOR ARRAY, 10K	
RA419	D1H81034A024	RESISTOR ARRAY, 10K	
RA420	D1H81034A024	RESISTOR ARRAY, 10K	
RA421	D1H81014A024	RESISTOR ARRAY, 100	
RA422	D1H81034A024	RESISTOR ARRAY, 10K	
RA423	D1H86804A024	RESISTOR ARRAY, 68	
RA424	D1H86804A024	RESISTOR ARRAY, 68	
RA425	D1H86804A024	RESISTOR ARRAY, 68	
RA426	D1H86804A024	RESISTOR ARRAY, 68	
RA427	D1H86804A024	RESISTOR ARRAY, 68	
RA428	D1H81034A024	RESISTOR ARRAY, 10K	
		(COILS)	
L1	G1B680MA0001	COIL	
L2	G1A221C00004	COIL	
		(CRYSTAL OSCILLATOR)	
X1	PSVCC0025GT	CRYSTAL OSCILLATOR	S
		(FILTERS)	
FIL1	J0HAAH000003	IC FILTER	
FIL2	J0HAAH000003	IC FILTER	
FIL402	J0HAAH000003	IC FILTER	
FIL403	J0HAAH000003	IC FILTER	
FIL404	J0HAAB000020	IC FILTER	S

Ref. No.	Part No.	Part Name & Description	Remarks
L1A	J0JHC0000060	IC FILTER	S
L1B	J0JHC0000060	IC FILTER	
L1C	J0JHC0000060	IC FILTER	
L1D	J0JHC0000060	IC FILTER	
L1E	J0JHC0000060	IC FILTER	
L1F	J0JHC0000060	IC FILTER	
L1G	J0JHC0000060	IC FILTER	
L1H	J0JHC0000060	IC FILTER	
L1I	J0JHC0000060	IC FILTER	
L1J	J0JHC0000060	IC FILTER	
L1K	J0JHC0000060	IC FILTER	
L1L	J0JHC0000060	IC FILTER	
L1M	J0JHC0000060	IC FILTER	
L1N	J0JHC0000060	IC FILTER	
L1O	J0JHC0000060	IC FILTER	
L1P	J0JHC0000060	IC FILTER	
L2A	J0JHC0000060	IC FILTER	
L2B	J0JHC0000060	IC FILTER	
L2C	J0JHC0000060	IC FILTER	
L2D	J0JHC0000060	IC FILTER	
L2E	J0JHC0000060	IC FILTER	
L2F	J0JHC0000060	IC FILTER	
L2G	J0JHC0000060	IC FILTER	
L2H	J0JHC0000060	IC FILTER	
L2I	J0JHC0000060	IC FILTER	
L2J	J0JHC0000060	IC FILTER	
L2K	J0JHC0000060	IC FILTER	
L2L	J0JHC0000060	IC FILTER	
L2M	J0JHC0000060	IC FILTER	
L2N	J0JHC0000060	IC FILTER	
L2O	J0JHC0000060	IC FILTER	
L2P	J0JHC0000060	IC FILTER	
L3A	J0JHC0000060	IC FILTER	
L3B	J0JHC0000060	IC FILTER	
L3C	J0JHC0000060	IC FILTER	
L3D	J0JHC0000060	IC FILTER	
L3E	J0JHC0000060	IC FILTER	
L3F	J0JHC0000060	IC FILTER	
L3G	J0JHC0000060	IC FILTER	
L3H	J0JHC0000060	IC FILTER	
L3I	J0JHC0000060	IC FILTER	
L3J	J0JHC0000060	IC FILTER	
L3K	J0JHC0000060	IC FILTER	
L3L	J0JHC0000060	IC FILTER	
L3M	J0JHC0000060	IC FILTER	
L3N	J0JHC0000060	IC FILTER	
L3O	J0JHC0000060	IC FILTER	
L3P	J0JHC0000060	IC FILTER	
L4A	J0JHC0000060	IC FILTER	
L4B	J0JHC0000060	IC FILTER	
L4C	J0JHC0000060	IC FILTER	
L4D	J0JHC0000060	IC FILTER	
L4E	J0JHC0000060	IC FILTER	
L4F	J0JHC0000060	IC FILTER	
L4G	J0JHC0000060	IC FILTER	
L4H	J0JHC0000060	IC FILTER	
L4I	J0JHC0000060	IC FILTER	
L4J	J0JHC0000060	IC FILTER	
L4K	J0JHC0000060	IC FILTER	
L4L	J0JHC0000060	IC FILTER	
L4M	J0JHC0000060	IC FILTER	
L4N	J0JHC0000060	IC FILTER	
L4O	J0JHC0000060	IC FILTER	
L4P	J0JHC0000060	IC FILTER	
L31	PFVF2P600SG	CERAMIC FILTER	S
L32	PFVF2P600SG	CERAMIC FILTER	S
L34	J0JCC0000275	IC FILTER	
L101	J0JCC0000275	IC FILTER	
L401	J0JCC0000275	IC FILTER	
L402	J0JCC0000275	IC FILTER	
L403	J0JCC0000275	IC FILTER	
LA1	J0JAD0000036	IC FILTER	
LA2	J0JAD0000036	IC FILTER	

Ref. No.	Part No.	Part Name & Description	Remarks
LA3	J0JAD0000036	IC FILTER	
LA4	J0JAD0000036	IC FILTER	
LA5	J0JAD0000036	IC FILTER	
LA6	J0JAD0000036	IC FILTER	
LA401	J0JAD0000036	IC FILTER	
LA402	J0JAD0000036	IC FILTER	
LA403	J0JAD0000036	IC FILTER	
LA404	J0JAD0000036	IC FILTER	
LA405	J0JAD0000036	IC FILTER	
LA406	J0JAD0000036	IC FILTER	
LA407	J0JAD0000036	IC FILTER	
LA408	J0JAD0000036	IC FILTER	
LA409	J0JAD0000036	IC FILTER	
X401	H2D122500003	CERAMIC FILTER	
		(FUSES)	
IP1	K5H502Z00003	FUSE	
IP2	K5H751Z00003	FUSE	
IP3	K5H751Z00003	FUSE	
		(JACKS)	
CN3	K2LB104B0055	JACK	
CN4	K2LB104B0055	JACK	
		(PHOTO ELECTRIC TRANSDUCERS)	
PC1A	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1B	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1C	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1D	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1E	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1F	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1G	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1H	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1I	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1J	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1K	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1L	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1M	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1N	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1O	PQVIP27011M3	PHOTO COUPER	⚠ S
PC1P	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2A	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2B	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2C	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2D	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2E	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2F	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2G	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2H	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2I	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2J	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2K	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2L	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2M	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2N	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2O	PQVIP27011M3	PHOTO COUPER	⚠ S
PC2P	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4A	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4B	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4C	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4D	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4E	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4F	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4G	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4H	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4I	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4J	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4K	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4L	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4M	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4N	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4O	PQVIP27011M3	PHOTO COUPER	⚠ S
PC4P	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5A	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5B	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5C	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5D	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5E	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5F	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5G	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5H	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5I	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5J	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5K	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5L	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5M	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5N	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5O	PQVIP27011M3	PHOTO COUPER	⚠ S
PC5P	PQVIP27011M3	PHOTO COUPER	⚠ S
		(RELAYS)	
PL2A	K6G1ALB00014	RELAY	⚠ S
PL2B	K6G1ALB00014	RELAY	⚠ S
PL2C	K6G1ALB00014	RELAY	⚠ S
PL2D	K6G1ALB00014	RELAY	⚠ S
PL2E	K6G1ALB00014	RELAY	⚠ S
PL2F	K6G1ALB00014	RELAY	⚠ S
PL2G	K6G1ALB00014	RELAY	⚠ S
PL2H	K6G1ALB00014	RELAY	⚠ S
PL2I	K6G1ALB00014	RELAY	⚠ S
PL2J	K6G1ALB00014	RELAY	⚠ S
PL2K	K6G1ALB00014	RELAY	⚠ S
PL2L	K6G1ALB00014	RELAY	⚠ S
PL2M	K6G1ALB00014	RELAY	⚠ S
PL2N	K6G1ALB00014	RELAY	⚠ S
PL2O	K6G1ALB00014	RELAY	⚠ S
PL2P	K6G1ALB00014	RELAY	⚠ S
RL1A	K6B2CGA00094	RELAY	⚠
RL1B	K6B2CGA00094	RELAY	⚠
RL1C	K6B2CGA00094	RELAY	⚠
RL1D	K6B2CGA00094	RELAY	⚠
RL1E	K6B2CGA00094	RELAY	⚠
RL1F	K6B2CGA00094	RELAY	⚠
RL1G	K6B2CGA00094	RELAY	⚠
RL1H	K6B2CGA00094	RELAY	⚠
RL1I	K6B2CGA00094	RELAY	⚠
RL1J	K6B2CGA00094	RELAY	⚠
RL1K	K6B2CGA00094	RELAY	⚠
RL1L	K6B2CGA00094	RELAY	⚠
RL1M	K6B2CGA00094	RELAY	⚠
RL1N	K6B2CGA00094	RELAY	⚠
RL1O	K6B2CGA00094	RELAY	⚠
RL1P	K6B2CGA00094	RELAY	⚠
		(SWITCHS)	
SW1	PSSSX1001Z	SLIDE SWITCH	
SW2	PSSSX1001Z	SLIDE SWITCH	
		(TRANSFORMERS)	
T1A	ETJS08ZE11AF	TRANSFORMER	⚠
T1B	ETJS08ZE11AF	TRANSFORMER	⚠
T1C	ETJS08ZE11AF	TRANSFORMER	⚠
T1D	ETJS08ZE11AF	TRANSFORMER	⚠
T1E	ETJS08ZE11AF	TRANSFORMER	⚠
T1F	ETJS08ZE11AF	TRANSFORMER	⚠
T1G	ETJS08ZE11AF	TRANSFORMER	⚠
T1H	ETJS08ZE11AF	TRANSFORMER	⚠
T1I	ETJS08ZE11AF	TRANSFORMER	⚠
T1J	ETJS08ZE11AF	TRANSFORMER	⚠
T1K	ETJS08ZE11AF	TRANSFORMER	⚠
T1L	ETJS08ZE11AF	TRANSFORMER	⚠
T1M	ETJS08ZE11AF	TRANSFORMER	⚠
T1N	ETJS08ZE11AF	TRANSFORMER	⚠
T1O	ETJS08ZE11AF	TRANSFORMER	⚠
T1P	ETJS08ZE11AF	TRANSFORMER	⚠
		(VARISTORS)	
SA1A	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1B	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1C	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1D	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1E	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1F	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠

Ref. No.	Part No.	Part Name & Description	Remarks
SA1G	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1H	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1I	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1J	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1K	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1L	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1M	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1N	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1O	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA1P	J0LE00000043	VARISTOR (SURGE ABSORBER)	⚠
SA3	PFRZRA102P6T	VARISTOR (SURGE ABSORBER)	⚠ S
ZNR1A	ERZSF2MK820	VARISTOR	
ZNR1B	ERZSF2MK820	VARISTOR	
ZNR1C	ERZSF2MK820	VARISTOR	
ZNR1D	ERZSF2MK820	VARISTOR	
ZNR1E	ERZSF2MK820	VARISTOR	
ZNR1F	ERZSF2MK820	VARISTOR	
ZNR1G	ERZSF2MK820	VARISTOR	
ZNR1H	ERZSF2MK820	VARISTOR	
ZNR1I	ERZSF2MK820	VARISTOR	
ZNR1J	ERZSF2MK820	VARISTOR	
ZNR1K	ERZSF2MK820	VARISTOR	
ZNR1L	ERZSF2MK820	VARISTOR	
ZNR1M	ERZSF2MK820	VARISTOR	
ZNR1N	ERZSF2MK820	VARISTOR	
ZNR1O	ERZSF2MK820	VARISTOR	
ZNR1P	ERZSF2MK820	VARISTOR	
		(CAPACITORS)	
C1A	PSCU2JW221KR	220P	
C1B	PSCU2JW221KR	220P	
C1C	PSCU2JW221KR	220P	
C1D	PSCU2JW221KR	220P	
C1E	PSCU2JW221KR	220P	
C1F	PSCU2JW221KR	220P	
C1G	PSCU2JW221KR	220P	
C1H	PSCU2JW221KR	220P	
C1I	PSCU2JW221KR	220P	
C1J	PSCU2JW221KR	220P	
C1K	PSCU2JW221KR	220P	
C1L	PSCU2JW221KR	220P	
C1M	PSCU2JW221KR	220P	
C1N	PSCU2JW221KR	220P	
C1O	PSCU2JW221KR	220P	
C1P	PSCU2JW221KR	220P	
C2A	F1K2E1050001	1	
C2B	F1K2E1050001	1	
C2C	F1K2E1050001	1	
C2D	F1K2E1050001	1	
C2E	F1K2E1050001	1	
C2F	F1K2E1050001	1	
C2G	F1K2E1050001	1	
C2H	F1K2E1050001	1	
C2I	F1K2E1050001	1	
C2J	F1K2E1050001	1	
C2K	F1K2E1050001	1	
C2L	F1K2E1050001	1	
C2M	F1K2E1050001	1	
C2N	F1K2E1050001	1	
C2O	F1K2E1050001	1	
C2P	F1K2E1050001	1	
C3A	EEEFK1H100UR	10	
C3B	EEEFK1H100UR	10	
C3C	EEEFK1H100UR	10	
C3D	EEEFK1H100UR	10	
C3E	EEEFK1H100UR	10	
C3F	EEEFK1H100UR	10	
C3G	EEEFK1H100UR	10	
C3H	EEEFK1H100UR	10	
C3I	EEEFK1H100UR	10	
C3J	EEEFK1H100UR	10	
C3K	EEEFK1H100UR	10	
C3L	EEEFK1H100UR	10	
C3M	EEEFK1H100UR	10	

Ref. No.	Part No.	Part Name & Description	Remarks
C3N	EEEFK1H100UR	10	
C3O	EEEFK1H100UR	10	
C3P	EEEFK1H100UR	10	
C4	EEVUD1E680MP	68	
C4A	EEEFK1H100UR	10	
C4B	EEEFK1H100UR	10	
C4C	EEEFK1H100UR	10	
C4D	EEEFK1H100UR	10	
C4E	EEEFK1H100UR	10	
C4F	EEEFK1H100UR	10	
C4G	EEEFK1H100UR	10	
C4H	EEEFK1H100UR	10	
C4I	EEEFK1H100UR	10	
C4J	EEEFK1H100UR	10	
C4K	EEEFK1H100UR	10	
C4L	EEEFK1H100UR	10	
C4M	EEEFK1H100UR	10	
C4N	EEEFK1H100UR	10	
C4O	EEEFK1H100UR	10	
C4P	EEEFK1H100UR	10	
C5	EEVUD1E151MP	10	
C5A	F1G1H220A565	22	
C5B	F1G1H220A565	22	
C5C	F1G1H220A565	22	
C5D	F1G1H220A565	22	
C5E	F1G1H220A565	22	
C5F	F1G1H220A565	22	
C5G	F1G1H220A565	22	
C5H	F1G1H220A565	22	
C5I	F1G1H220A565	22	
C5J	F1G1H220A565	22	
C5K	F1G1H220A565	22	
C5L	F1G1H220A565	22	
C5M	F1G1H220A565	22	
C5N	F1G1H220A565	22	
C5O	F1G1H220A565	22	
C5P	F1G1H220A565	22	
C6	F1G1H103A573	0.01	
C7	F1G1H103A573	0.01	
C7A	F1G1A1040006	0.1	
C7B	F1G1A1040006	0.1	
C7C	F1G1A1040006	0.1	
C7D	F1G1A1040006	0.1	
C7E	F1G1A1040006	0.1	
C7F	F1G1A1040006	0.1	
C7G	F1G1A1040006	0.1	
C7H	F1G1A1040006	0.1	
C7I	F1G1A1040006	0.1	
C7J	F1G1A1040006	0.1	
C7K	F1G1A1040006	0.1	
C7L	F1G1A1040006	0.1	
C7M	F1G1A1040006	0.1	
C7N	F1G1A1040006	0.1	
C7O	F1G1A1040006	0.1	
C7P	F1G1A1040006	0.1	
C8	F1G1A1040006	0.1	
C8A	F1K1C1060001	1M	
C8B	F1K1C1060001	1M	
C8C	F1K1C1060001	1M	
C8D	F1K1C1060001	1M	
C8E	F1K1C1060001	1M	
C8F	F1K1C1060001	1M	
C8G	F1K1C1060001	1M	
C8H	F1K1C1060001	1M	
C8I	F1K1C1060001	1M	
C8J	F1K1C1060001	1M	
C8K	F1K1C1060001	1M	
C8L	F1K1C1060001	1M	
C8M	F1K1C1060001	1M	
C8N	F1K1C1060001	1M	
C8O	F1K1C1060001	1M	
C8P	F1K1C1060001	1M	
C9	F1G1A1040006	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C9A	F1G1H220A565	22	
C9B	F1G1H220A565	22	
C9C	F1G1H220A565	22	
C9D	F1G1H220A565	22	
C9E	F1G1H220A565	22	
C9F	F1G1H220A565	22	
C9G	F1G1H220A565	22	
C9H	F1G1H220A565	22	
C9I	F1G1H220A565	22	
C9J	F1G1H220A565	22	
C9K	F1G1H220A565	22	
C9L	F1G1H220A565	22	
C9M	F1G1H220A565	22	
C9N	F1G1H220A565	22	
C9O	F1G1H220A565	22	
C9P	F1G1H220A565	22	
C10	F1G1A1040006	0.1	
C10A	F1G1H220A565	22	
C10B	F1G1H220A565	22	
C10C	F1G1H220A565	22	
C10D	F1G1H220A565	22	
C10E	F1G1H220A565	22	
C10F	F1G1H220A565	22	
C10G	F1G1H220A565	22	
C10H	F1G1H220A565	22	
C10I	F1G1H220A565	22	
C10J	F1G1H220A565	22	
C10K	F1G1H220A565	22	
C10L	F1G1H220A565	22	
C10M	F1G1H220A565	22	
C10N	F1G1H220A565	22	
C10O	F1G1H220A565	22	
C10P	F1G1H220A565	22	
C11	F1G1H180A565	18	
C11A	F1G1A1040006	0.1	
C11B	F1G1A1040006	0.1	
C11C	F1G1A1040006	0.1	
C11D	F1G1A1040006	0.1	
C11E	F1G1A1040006	0.1	
C11F	F1G1A1040006	0.1	
C11G	F1G1A1040006	0.1	
C11H	F1G1A1040006	0.1	
C11I	F1G1A1040006	0.1	
C11J	F1G1A1040006	0.1	
C11K	F1G1A1040006	0.1	
C11L	F1G1A1040006	0.1	
C11M	F1G1A1040006	0.1	
C11N	F1G1A1040006	0.1	
C11O	F1G1A1040006	0.1	
C11P	F1G1A1040006	0.1	
C12	EEVUD0J331MP	330	
C13	F2H1C220A008	22	
C14	F1G1H180A565	18	
C16	ECUV1A105ZFV	1	
C17	F1G1C1030008	0.01	
C18	F1G1A1040006	0.1	
C20	ECUV1A105ZFV	1	
C21	F1G1C1030008	0.01	
C23	F1G1H103A573	0.01	
C24	F1G1E1030005	0.01	
C26	F1G0J2240003	0.22	
C27	F1G1A1040006	0.1	
C28	F1G1A1040006	0.1	
C29	F1G1A1040006	0.1	
C30	F1G1A1040006	0.1	
C31	F1H1C105A008	1	⚠
C32	PQCUV1H105JC	1	S
C33	F1G0J2240003	0.22	
C34	F1G1A1040006	0.1	
C35	F1G1A1040006	0.1	
C36	F1G1A1040006	0.1	
C37	F1G1A1040006	0.1	
C38	PQCUV1H105JC	1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C39	F1G0J2240003	0.22	
C40	F1G1A1040006	0.1	
C41	F1G1A1040006	0.1	
C42	F1G1A1040006	0.1	
C43	F1G1A1040006	0.1	
C44	PQCUV1H105JC	1	S
C45	F1G0J2240003	0.22	
C46	F1G1A1040006	0.1	
C47	F1G1A1040006	0.1	
C48	F1G1A1040006	0.1	
C49	F1G1A1040006	0.1	
C50	PQCUV1H105JC	1	S
C50A	F1G0J4740004	0.47	
C50B	F1G0J4740004	0.47	
C50C	F1G0J4740004	0.47	
C50D	F1G0J4740004	0.47	
C50E	F1G0J4740004	0.47	
C50F	F1G0J4740004	0.47	
C50G	F1G0J4740004	0.47	
C50H	F1G0J4740004	0.47	
C50I	F1G0J4740004	0.47	
C50J	F1G0J4740004	0.47	
C50K	F1G0J4740004	0.47	
C50L	F1G0J4740004	0.47	
C50M	F1G0J4740004	0.47	
C50N	F1G0J4740004	0.47	
C50O	F1G0J4740004	0.47	
C50P	F1G0J4740004	0.47	
C51A	F1G0J4740004	0.47	
C51B	F1G0J4740004	0.47	
C51C	F1G0J4740004	0.47	
C51D	F1G0J4740004	0.47	
C51E	F1G0J4740004	0.47	
C51F	F1G0J4740004	0.47	
C51G	F1G0J4740004	0.47	
C51H	F1G0J4740004	0.47	
C51I	F1G0J4740004	0.47	
C51J	F1G0J4740004	0.47	
C51K	F1G0J4740004	0.47	
C51L	F1G0J4740004	0.47	
C51M	F1G0J4740004	0.47	
C51N	F1G0J4740004	0.47	
C51O	F1G0J4740004	0.47	
C51P	F1G0J4740004	0.47	
C53	F1G1C1030008	0.01	
C54	F1G1C1030008	0.01	
C55	F1G1C1030008	0.01	
C56	F1G1C1030008	0.01	
C57	F1G1H3320004	0.033	
C60	F1G1E1030005	0.01	
C62	F1H1C105A008	1	⚠
C63	F1G1E1030005	0.01	
C65	F1H1C105A008	1	⚠
C66	F1G1E1030005	0.01	
C68	F1H1C105A008	1	⚠
C69	F1G1A1040006	0.1	
C70	F1G1A1040006	0.1	
C71	F1G0J1050009	1	
C73	F1G0J1050009	1	
C75	F1G0J1050009	1	
C77	F1G0J1050009	1	
C80	F1G1C1030008	0.01	
C81	F1G1C1030008	0.01	
C82	F1G1C1030008	0.01	
C83	F1G1C1030008	0.01	
C84	F1G1C1030008	0.01	
C90	F1G1A1040006	0.1	
C402	F1G1H103A573	0.01	
C403	ECUV1A105ZFV	1	
C404	F1G1H103A573	0.01	
C405	F1G1H103A573	0.01	
C406	ECUV1A105ZFV	1	
C407	F1G1H103A573	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C408	F1G1H103A573	0.01	
C409	F1G1H103A573	0.01	
C410	F1G1H103A573	0.01	
C411	F1G1H103A573	0.01	
C412	F1G1H103A573	0.01	
C413	ECUV1A105ZFV	1	
C421	F1G1H103A573	0.01	
C422	F1G1H103A573	0.01	
C423	F1G1H103A573	0.01	
C424	F1G1H103A573	0.01	
C425	F1G1H103A573	0.01	
C426	F1G1H103A573	0.01	
C427	F1G1H103A573	0.01	
C428	F1G1H103A573	0.01	
C429	F1G1H103A573	0.01	
C430	F1G1H103A573	0.01	
C431	F1G1H103A573	0.01	
C432	F1G1H103A573	0.01	
C433	F1G1H103A573	0.01	
C434	F1G1H103A573	0.01	
C435	F1G1H103A573	0.01	
C436	F1G1H103A573	0.01	
C437	F1G1H103A573	0.01	
C438	F1G1H103A573	0.01	
C439	F1G1H103A573	0.01	
C440	F1G1H103A573	0.01	
C441	F1G1E221A090	220	
C442	F1G1E221A090	220	
C443	F1G1E221A090	220	
C444	F1G1E221A090	220	
C445	F1G1E221A090	220	
C446	F1G1E221A090	220	
C447	F1G1E221A090	220	
C448	F1G1E221A090	220	
C449	F1G1E221A090	220	
C450	F1G1E221A090	220	
C451	F1G1E221A090	220	
C452	F1G1E221A090	220	
C453	F1G1E221A090	220	
C454	F1G1E221A090	220	
C455	F1G1E221A090	220	
C456	F1G1E221A090	220	
C457	F1G1E221A090	220	
C458	F1G1E221A090	220	
C459	F1G1E221A090	220	
C460	F1G1E221A090	220	
		(RESISTORS)	
J3	ERJ2GEJ000	0	S
J4	ERJ2GEJ000	0	S
J5	ERJ2GEJ000	0	S
J5A	PQ4R18XJ000	0	S
J5B	PQ4R18XJ000	0	S
J5C	PQ4R18XJ000	0	S
J5D	PQ4R18XJ000	0	S
J5E	PQ4R18XJ000	0	S
J5F	PQ4R18XJ000	0	S
J5G	PQ4R18XJ000	0	S
J5H	PQ4R18XJ000	0	S
J5I	PQ4R18XJ000	0	S
J5J	PQ4R18XJ000	0	S
J5K	PQ4R18XJ000	0	S
J5L	PQ4R18XJ000	0	S
J5M	PQ4R18XJ000	0	S
J5N	PQ4R18XJ000	0	S
J5O	PQ4R18XJ000	0	S
J5P	PQ4R18XJ000	0	S
J6	ERJ2GEJ000	0	S
J7	ERJ2GEJ000	0	S
J7A	PQ4R18XJ000	0	S
J7B	PQ4R18XJ000	0	S
J7C	PQ4R18XJ000	0	S
J7D	PQ4R18XJ000	0	S
J7E	PQ4R18XJ000	0	S
J7F	PQ4R18XJ000	0	S
J7G	PQ4R18XJ000	0	S
J7H	PQ4R18XJ000	0	S
J7I	PQ4R18XJ000	0	S
J7J	PQ4R18XJ000	0	S
J7K	PQ4R18XJ000	0	S
J7L	PQ4R18XJ000	0	S
J7M	PQ4R18XJ000	0	S
J7N	PQ4R18XJ000	0	S
J7O	PQ4R18XJ000	0	S
J7P	PQ4R18XJ000	0	S
J8	ERJ2GEJ000	0	S
J9	ERJ2GEJ000	0	S
J9A	PQ4R10XJ000	0	S
J9B	PQ4R10XJ000	0	S
J9C	PQ4R10XJ000	0	S
J9D	PQ4R10XJ000	0	S
J9E	PQ4R10XJ000	0	S
J9F	PQ4R10XJ000	0	S
J9G	PQ4R10XJ000	0	S
J9H	PQ4R10XJ000	0	S
J9I	PQ4R10XJ000	0	S
J9J	PQ4R10XJ000	0	S
J9K	PQ4R10XJ000	0	S
J9L	PQ4R10XJ000	0	S
J9M	PQ4R10XJ000	0	S
J9N	PQ4R10XJ000	0	S
J9O	PQ4R10XJ000	0	S
J9P	PQ4R10XJ000	0	S
J13	ERJ2GEJ000	0	S
J14	ERJ2GEJ000	0	S
J15	ERJ2GEJ000	0	S
J16	ERJ2GEJ000	0	S
J17	PQ4R18XJ000	0	S
J40	ERJ2GEJ000	0	S
J41	ERJ2GEJ000	0	S
J42	ERJ2GEJ000	0	S
J45	ERJ2GEJ000	0	S
J47	ERJ2GEJ000	0	S
J48	ERJ2GEJ000	0	S
J49	ERJ2GEJ000	0	S
J53	ERJ2GEJ000	0	S
J54	ERJ2GEJ000	0	S
J55	ERJ2GEJ000	0	S
J56	PQ4R10XJ000	0	S
J57	PQ4R10XJ000	0	S
J101	ERJ3GEY0R00	0	
J102	ERJ3GEY0R00	0	
J103	ERJ3GEY0R00	0	
J402	ERJ2GEJ000	0	S
J403	ERJ2GEJ000	0	S
J404	ERJ2GEJ000	0	S
J405	ERJ2GEJ000	0	S
J408	ERJ2GEJ000	0	S
R1	ERJ2GEYJ560	56	S
R2	ERJ2GEYJ560	56	S
R2A	ERJ1WYJ223	22K	
R2B	ERJ1WYJ223	22K	
R2C	ERJ1WYJ223	22K	
R2D	ERJ1WYJ223	22K	
R2E	ERJ1WYJ223	22K	
R2F	ERJ1WYJ223	22K	
R2G	ERJ1WYJ223	22K	
R2H	ERJ1WYJ223	22K	
R2I	ERJ1WYJ223	22K	
R2J	ERJ1WYJ223	22K	
R2K	ERJ1WYJ223	22K	
R2L	ERJ1WYJ223	22K	
R2M	ERJ1WYJ223	22K	
R2N	ERJ1WYJ223	22K	
R2O	ERJ1WYJ223	22K	
R2P	ERJ1WYJ223	22K	
R3	ERJ2GEYJ151	150	S

Ref. No.	Part No.	Part Name & Description	Remarks
R4	ERJ2GEYJ151	150	S
R5A	ERJ8GEYJ390	39	
R5B	ERJ8GEYJ390	39	
R5C	ERJ8GEYJ390	39	
R5D	ERJ8GEYJ390	39	
R5E	ERJ8GEYJ390	39	
R5F	ERJ8GEYJ390	39	
R5G	ERJ8GEYJ390	39	
R5H	ERJ8GEYJ390	39	
R5I	ERJ8GEYJ390	39	
R5J	ERJ8GEYJ390	39	
R5K	ERJ8GEYJ390	39	
R5L	ERJ8GEYJ390	39	
R5M	ERJ8GEYJ390	39	
R5N	ERJ8GEYJ390	39	
R5O	ERJ8GEYJ390	39	
R5P	ERJ8GEYJ390	39	
R6A	PQ4R10XJ472	4.7K	S
R6B	PQ4R10XJ472	4.7K	S
R6C	PQ4R10XJ472	4.7K	S
R6D	PQ4R10XJ472	4.7K	S
R6E	PQ4R10XJ472	4.7K	S
R6F	PQ4R10XJ472	4.7K	S
R6G	PQ4R10XJ472	4.7K	S
R6H	PQ4R10XJ472	4.7K	S
R6I	PQ4R10XJ472	4.7K	S
R6J	PQ4R10XJ472	4.7K	S
R6K	PQ4R10XJ472	4.7K	S
R6L	PQ4R10XJ472	4.7K	S
R6M	PQ4R10XJ472	4.7K	S
R6N	PQ4R10XJ472	4.7K	S
R6O	PQ4R10XJ472	4.7K	S
R6P	PQ4R10XJ472	4.7K	S
R75	ERJ2GEJ470	47	S
R76	ERJ2GEJ470	47	S
R7A	PQ4R10XJ822	8.2K	S
R7B	PQ4R10XJ822	8.2K	S
R7C	PQ4R10XJ822	8.2K	S
R7D	PQ4R10XJ822	8.2K	S
R7E	PQ4R10XJ822	8.2K	S
R7F	PQ4R10XJ822	8.2K	S
R7G	PQ4R10XJ822	8.2K	S
R7H	PQ4R10XJ822	8.2K	S
R7I	PQ4R10XJ822	8.2K	S
R7J	PQ4R10XJ822	8.2K	S
R7K	PQ4R10XJ822	8.2K	S
R7L	PQ4R10XJ822	8.2K	S
R7M	PQ4R10XJ822	8.2K	S
R7N	PQ4R10XJ822	8.2K	S
R7O	PQ4R10XJ822	8.2K	S
R7P	PQ4R10XJ822	8.2K	S
R10A	ERJ2RHD511	510	
R10B	ERJ2RHD511	510	
R10C	ERJ2RHD511	510	
R10D	ERJ2RHD511	510	
R10E	ERJ2RHD511	510	
R10F	ERJ2RHD511	510	
R10G	ERJ2RHD511	510	
R10H	ERJ2RHD511	510	
R10I	ERJ2RHD511	510	
R10J	ERJ2RHD511	510	
R10K	ERJ2RHD511	510	
R10L	ERJ2RHD511	510	
R10M	ERJ2RHD511	510	
R10N	ERJ2RHD511	510	
R10O	ERJ2RHD511	510	
R10P	ERJ2RHD511	510	
R11A	ERJ2RHD104	100K	
R11B	ERJ2RHD104	100K	
R11C	ERJ2RHD104	100K	
R11D	ERJ2RHD104	100K	
R11E	ERJ2RHD104	100K	
R11F	ERJ2RHD104	100K	

Ref. No.	Part No.	Part Name & Description	Remarks
R11G	ERJ2RHD104	100K	
R11H	ERJ2RHD104	100K	
R11I	ERJ2RHD104	100K	
R11J	ERJ2RHD104	100K	
R11K	ERJ2RHD104	100K	
R11L	ERJ2RHD104	100K	
R11M	ERJ2RHD104	100K	
R11N	ERJ2RHD104	100K	
R11O	ERJ2RHD104	100K	
R11P	ERJ2RHD104	100K	
R12A	ERJ2RHD511	510	
R12B	ERJ2RHD511	510	
R12C	ERJ2RHD511	510	
R12D	ERJ2RHD511	510	
R12E	ERJ2RHD511	510	
R12F	ERJ2RHD511	510	
R12G	ERJ2RHD511	510	
R12H	ERJ2RHD511	510	
R12I	ERJ2RHD511	510	
R12J	ERJ2RHD511	510	
R12K	ERJ2RHD511	510	
R12L	ERJ2RHD511	510	
R12M	ERJ2RHD511	510	
R12N	ERJ2RHD511	510	
R12O	ERJ2RHD511	510	
R12P	ERJ2RHD511	510	
R13A	ERJ2RHD511	510	
R13B	ERJ2RHD511	510	
R13C	ERJ2RHD511	510	
R13D	ERJ2RHD511	510	
R13E	ERJ2RHD511	510	
R13F	ERJ2RHD511	510	
R13G	ERJ2RHD511	510	
R13H	ERJ2RHD511	510	
R13I	ERJ2RHD511	510	
R13J	ERJ2RHD511	510	
R13K	ERJ2RHD511	510	
R13L	ERJ2RHD511	510	
R13M	ERJ2RHD511	510	
R13N	ERJ2RHD511	510	
R13O	ERJ2RHD511	510	
R13P	ERJ2RHD511	510	
R14	ERJ2GEJ105X	1M	S
R14A	ERJ2RKF154	150K	
R14B	ERJ2RKF154	150K	
R14C	ERJ2RKF154	150K	
R14D	ERJ2RKF154	150K	
R14E	ERJ2RKF154	150K	
R14F	ERJ2RKF154	150K	
R14G	ERJ2RKF154	150K	
R14H	ERJ2RKF154	150K	
R14I	ERJ2RKF154	150K	
R14J	ERJ2RKF154	150K	
R14K	ERJ2RKF154	150K	
R14L	ERJ2RKF154	150K	
R14M	ERJ2RKF154	150K	
R14N	ERJ2RKF154	150K	
R14O	ERJ2RKF154	150K	
R14P	ERJ2RKF154	150K	
R15A	ERJ2RHD563	56K	
R15B	ERJ2RHD563	56K	
R15C	ERJ2RHD563	56K	
R15D	ERJ2RHD563	56K	
R15E	ERJ2RHD563	56K	
R15F	ERJ2RHD563	56K	
R15G	ERJ2RHD563	56K	
R15H	ERJ2RHD563	56K	
R15I	ERJ2RHD563	56K	
R15J	ERJ2RHD563	56K	
R15K	ERJ2RHD563	56K	
R15L	ERJ2RHD563	56K	
R15M	ERJ2RHD563	56K	
R15N	ERJ2RHD563	56K	

Ref. No.	Part No.	Part Name & Description	Remarks
R15O	ERJ2RHD563	56K	
R15P	ERJ2RHD563	56K	
R17A	ERJ2RHD913	91K	
R17B	ERJ2RHD913	91K	
R17C	ERJ2RHD913	91K	
R17D	ERJ2RHD913	91K	
R17E	ERJ2RHD913	91K	
R17F	ERJ2RHD913	91K	
R17G	ERJ2RHD913	91K	
R17H	ERJ2RHD913	91K	
R17I	ERJ2RHD913	91K	
R17J	ERJ2RHD913	91K	
R17K	ERJ2RHD913	91K	
R17L	ERJ2RHD913	91K	
R17M	ERJ2RHD913	91K	
R17N	ERJ2RHD913	91K	
R17O	ERJ2RHD913	91K	
R17P	ERJ2RHD913	91K	
R18A	ERJ2RHD104	100K	
R18B	ERJ2RHD104	100K	
R18C	ERJ2RHD104	100K	
R18D	ERJ2RHD104	100K	
R18E	ERJ2RHD104	100K	
R18F	ERJ2RHD104	100K	
R18G	ERJ2RHD104	100K	
R18H	ERJ2RHD104	100K	
R18I	ERJ2RHD104	100K	
R18J	ERJ2RHD104	100K	
R18K	ERJ2RHD104	100K	
R18L	ERJ2RHD104	100K	
R18M	ERJ2RHD104	100K	
R18N	ERJ2RHD104	100K	
R18O	ERJ2RHD104	100K	
R18P	ERJ2RHD104	100K	
R23A	ERJ2GEYJ103	10K	S
R23B	ERJ2GEYJ103	10K	S
R23C	ERJ2GEYJ103	10K	S
R23D	ERJ2GEYJ103	10K	S
R23E	ERJ2GEYJ103	10K	S
R23F	ERJ2GEYJ103	10K	S
R23G	ERJ2GEYJ103	10K	S
R23H	ERJ2GEYJ103	10K	S
R23I	ERJ2GEYJ103	10K	S
R23J	ERJ2GEYJ103	10K	S
R23K	ERJ2GEYJ103	10K	S
R23M	ERJ2GEYJ103	10K	S
R23N	ERJ2GEYJ103	10K	S
R23O	ERJ2GEYJ103	10K	S
R23P	ERJ2GEYJ103	10K	S
R32	ERJ2GEYJ103	10K	S
R37	ERJ2GEYJ103	10K	S
R38	D0GA272JA021	2.7K	
R39	ERJ2GEYJ103	10K	S
R40	ERJ2GEJ221	220	S
R50A	PQ4R18XJ220	22	S
R50B	PQ4R18XJ220	22	S
R50C	PQ4R18XJ220	22	S
R50D	PQ4R18XJ220	22	S
R50E	PQ4R18XJ220	22	S
R50F	PQ4R18XJ220	22	S
R50G	PQ4R18XJ220	22	S
R50H	PQ4R18XJ220	22	S
R50I	PQ4R18XJ220	22	S
R50J	PQ4R18XJ220	22	S
R50K	PQ4R18XJ220	22	S
R50L	PQ4R18XJ220	22	S
R50M	PQ4R18XJ220	22	S
R50N	PQ4R18XJ220	22	S
R50O	PQ4R18XJ220	22	S
R50P	PQ4R18XJ220	22	S
R51A	PQ4R10XJ122	1.2K	S
R51B	PQ4R10XJ122	1.2K	S
R51C	PQ4R10XJ122	1.2K	S
R51D	PQ4R10XJ122	1.2K	S
R51E	PQ4R10XJ122	1.2K	S
R51F	PQ4R10XJ122	1.2K	S
R51G	PQ4R10XJ122	1.2K	S
R51H	PQ4R10XJ122	1.2K	S
R51I	PQ4R10XJ122	1.2K	S
R51J	PQ4R10XJ122	1.2K	S
R51K	PQ4R10XJ122	1.2K	S
R51L	PQ4R10XJ122	1.2K	S
R51M	PQ4R10XJ122	1.2K	S
R51N	PQ4R10XJ122	1.2K	S
R51O	PQ4R10XJ122	1.2K	S
R51P	PQ4R10XJ122	1.2K	S
R52A	D0GA683JA021	68K	
R52B	D0GA683JA021	68K	
R52C	D0GA683JA021	68K	
R52D	D0GA683JA021	68K	
R52E	D0GA683JA021	68K	
R52F	D0GA683JA021	68K	
R52G	D0GA683JA021	68K	
R52H	D0GA683JA021	68K	
R52I	D0GA683JA021	68K	
R52J	D0GA683JA021	68K	
R52K	D0GA683JA021	68K	
R52L	D0GA683JA021	68K	
R52M	D0GA683JA021	68K	
R52N	D0GA683JA021	68K	
R52O	D0GA683JA021	68K	
R52P	D0GA683JA021	68K	
R53A	D0GA683JA021	68K	
R53B	D0GA683JA021	68K	
R53C	D0GA683JA021	68K	
R53D	D0GA683JA021	68K	
R53E	D0GA683JA021	68K	
R53F	D0GA683JA021	68K	
R53G	D0GA683JA021	68K	
R53H	D0GA683JA021	68K	
R53I	D0GA683JA021	68K	
R53J	D0GA683JA021	68K	
R53K	D0GA683JA021	68K	
R53L	D0GA683JA021	68K	
R53M	D0GA683JA021	68K	
R53N	D0GA683JA021	68K	
R53O	D0GA683JA021	68K	
R53P	D0GA683JA021	68K	
R80A	PQ4R10XJ221	220	S
R80B	PQ4R10XJ221	220	S
R80C	PQ4R10XJ221	220	S
R80D	PQ4R10XJ221	220	S
R80E	PQ4R10XJ221	220	S
R80F	PQ4R10XJ221	220	S
R80G	PQ4R10XJ221	220	S
R80H	PQ4R10XJ221	220	S
R80I	PQ4R10XJ221	220	S
R80J	PQ4R10XJ221	220	S
R80K	PQ4R10XJ221	220	S
R80L	PQ4R10XJ221	220	S
R80M	PQ4R10XJ221	220	S
R80N	PQ4R10XJ221	220	S
R80O	PQ4R10XJ221	220	S
R80P	PQ4R10XJ221	220	S
R81A	PQ4R10XJ101	100	S
R81B	PQ4R10XJ101	100	S
R81C	PQ4R10XJ101	100	S
R81D	PQ4R10XJ101	100	S
R81E	PQ4R10XJ101	100	S
R81F	PQ4R10XJ101	100	S
R81G	PQ4R10XJ101	100	S
R81H	PQ4R10XJ101	100	S
R81I	PQ4R10XJ101	100	S
R81J	PQ4R10XJ101	100	S
R81K	PQ4R10XJ101	100	S
R81L	PQ4R10XJ101	100	S

Ref. No.	Part No.	Part Name & Description	Remarks
R81M	PQ4R10XJ101	100	S
R81N	PQ4R10XJ101	100	S
R81O	PQ4R10XJ101	100	S
R81P	PQ4R10XJ101	100	S
R82	ERJ2GEJ220	22	S
R87A	ERJ2RHD913	91K	
R87B	ERJ2RHD913	91K	
R87C	ERJ2RHD913	91K	
R87D	ERJ2RHD913	91K	
R87E	ERJ2RHD913	91K	
R87F	ERJ2RHD913	91K	
R87G	ERJ2RHD913	91K	
R87H	ERJ2RHD913	91K	
R87I	ERJ2RHD913	91K	
R87J	ERJ2RHD913	91K	
R87K	ERJ2RHD913	91K	
R87L	ERJ2RHD913	91K	
R87M	ERJ2RHD913	91K	
R87N	ERJ2RHD913	91K	
R87O	ERJ2RHD913	91K	
R87P	ERJ2RHD913	91K	
R88	ERJ2GEJ221	220	S
R89	ERJ2GEJ220	22	S
R89A	ERJ2GEJ220	22	S
R89B	ERJ2GEJ220	22	S
R89C	ERJ2GEJ220	22	S
R89D	ERJ2GEJ220	22	S
R89E	ERJ2GEJ220	22	S
R89F	ERJ2GEJ220	22	S
R89G	ERJ2GEJ220	22	S
R89H	ERJ2GEJ220	22	S
R89I	ERJ2GEJ220	22	S
R89J	ERJ2GEJ220	22	S
R89K	ERJ2GEJ220	22	S
R89L	ERJ2GEJ220	22	S
R89M	ERJ2GEJ220	22	S
R89N	ERJ2GEJ220	22	S
R89O	ERJ2GEJ220	22	S
R89P	ERJ2GEJ220	22	S
R90	ERJ2GEJ220	22	S
R90A	ERJ2GEJ220	22	S
R90B	ERJ2GEJ220	22	S
R90C	ERJ2GEJ220	22	S
R90D	ERJ2GEJ220	22	S
R90E	ERJ2GEJ220	22	S
R90F	ERJ2GEJ220	22	S
R90G	ERJ2GEJ220	22	S
R90H	ERJ2GEJ220	22	S
R90I	ERJ2GEJ220	22	S
R90J	ERJ2GEJ220	22	S
R90K	ERJ2GEJ220	22	S
R90L	ERJ2GEJ220	22	S
R90M	ERJ2GEJ220	22	S
R90N	ERJ2GEJ220	22	S
R90O	ERJ2GEJ220	22	S
R90P	ERJ2GEJ220	22	S
R91	D0GA563JA004	56K	
R92	D0GA563JA004	56K	
R95	ERJ2GEYJ102	1K	S
R96	ERJ2GEYJ102	1K	S
R100	D0GA820JA021	82	
R111	ERJ2GEJ101	100	S
R112	ERJ2GEJ101	100	S
R113	ERJ2GEJ101	100	S
R114	ERJ2GEJ101	100	S
R115	ERJ2GEJ101	100	S
R116	ERJ2GEJ101	100	S
R117	ERJ2GEJ101	100	S
R118	ERJ2GEJ101	100	S
R119	ERJ2GEJ101	100	S
R120	ERJ2GEJ101	100	S
R132	ERJ2GEYJ102	1K	S
R162	ERJ2GEYJ102	1K	S

Ref. No.	Part No.	Part Name & Description	Remarks
R401	ERJ2GEJ393X	39K	
R402	ERJ2GEYJ103	10K	S
R403	D0GA680JA004	68	
R404	D0GA680JA004	68	
R405	ERJ2GEYJ103	10K	S
R406	ERJ2GEJ220	22	S
R407	ERJ2GEJ220	22	S
R410	D0GA331JA021	330	

15 FOR SCHEMATIC DIAGRAM

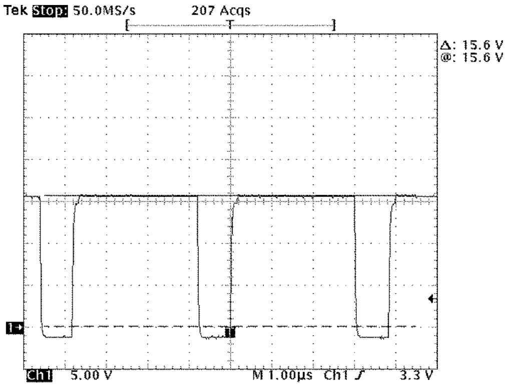
Note:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

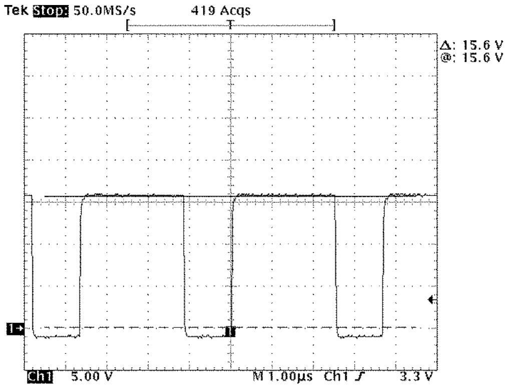
Important Safety Notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

2. This schematic diagram may be modified at any time with the development of new technology.

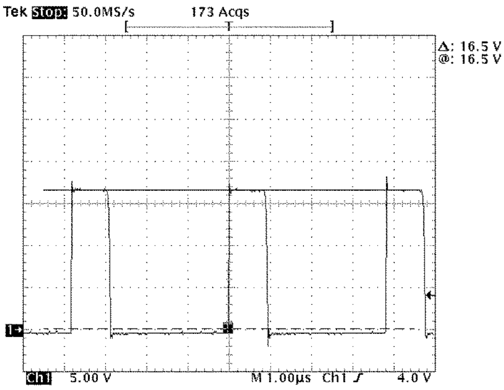
15.1. WAVEFORM



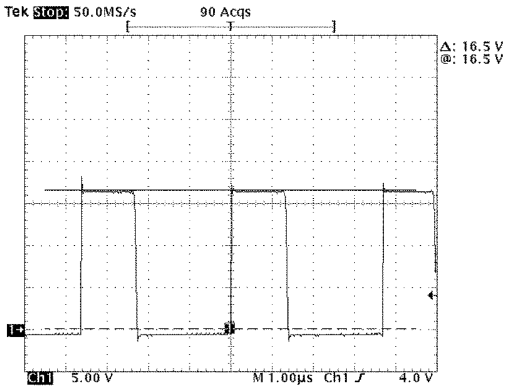
①



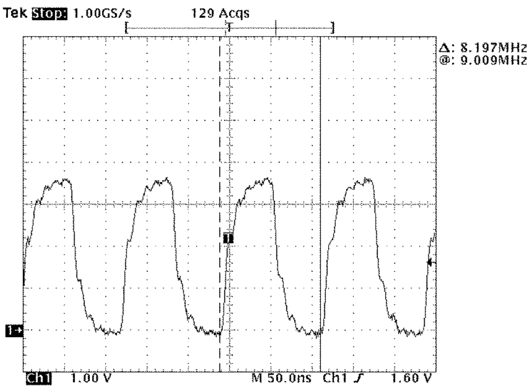
②



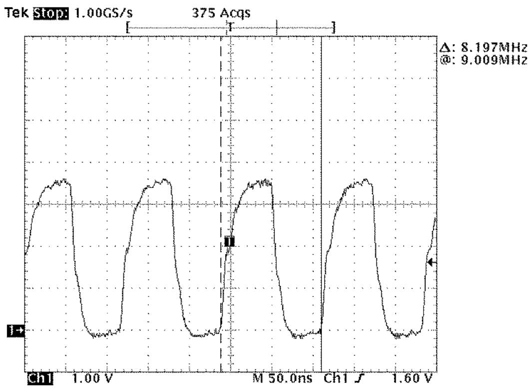
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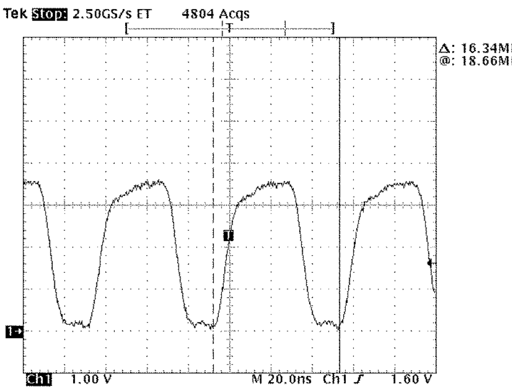
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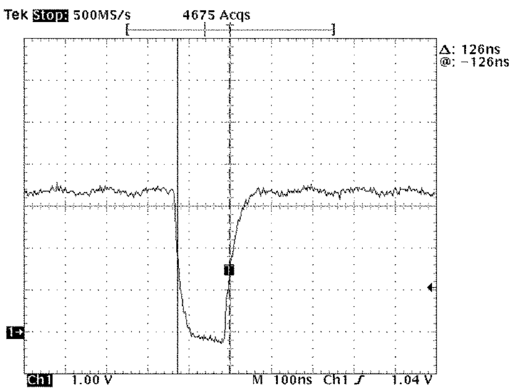
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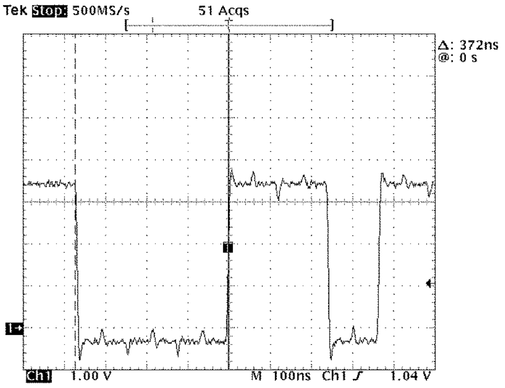
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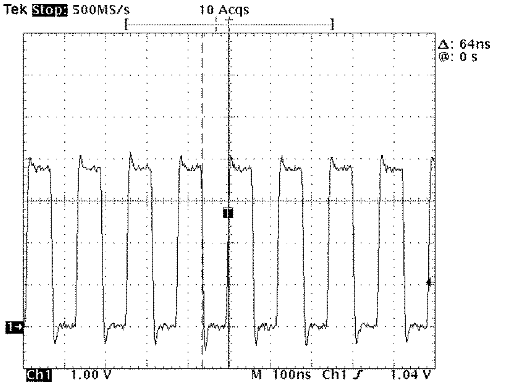
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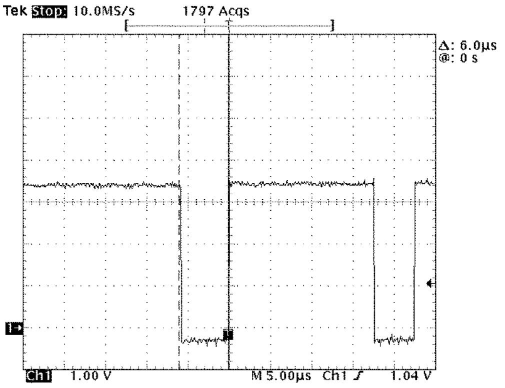
⑧


Tek Stop: 500MS/s 51 Acqs
Δ: 372ns
@: 0 s
Ch1 1.00 V M 100ns Ch1 ⨍ 1.04 V

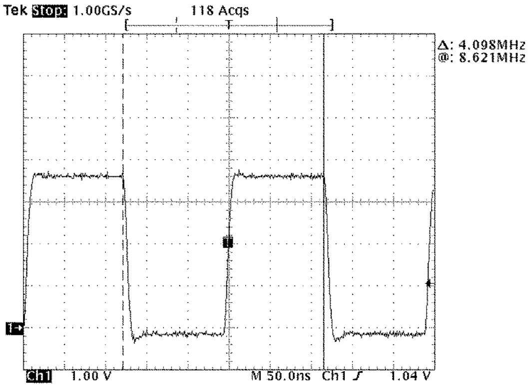
⑨


Tek Stop: 500MS/s 10 Acqs
Δ: 64ns
@: 0 s
Ch1 1.00 V M 100ns Ch1 ⨍ 1.04 V

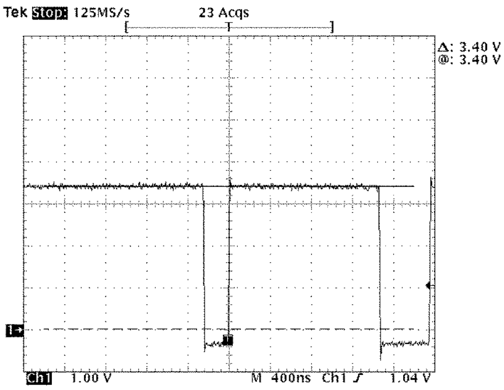
⑩


Tek Stop: 10.0MS/s 1797 Acqs
Δ: 6.0μs
@: 0 s
Ch1 1.00 V M 5.00μs Ch1 ⨍ 1.04 V

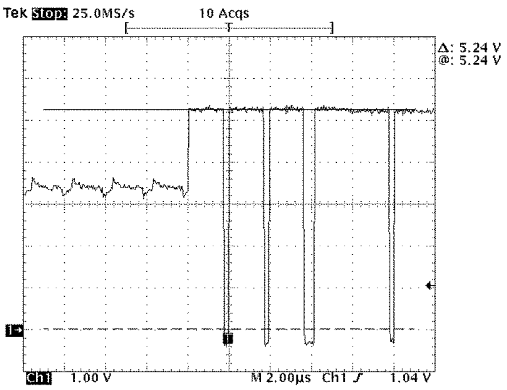
⑪


Tek Stop: 1.00GS/s 118 Acqs
Δ: 4.098MHz
@: 8.621MHz
Ch1 1.00 V M 50.0ns Ch1 ⨍ 1.04 V

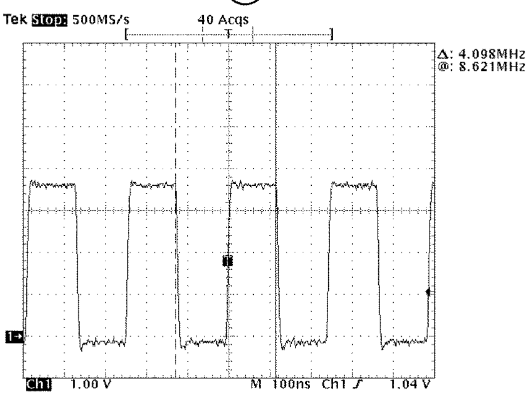
⑫


Tek Stop: 125MS/s 23 Acqs
Δ: 3.40 V
@: 3.40 V
Ch1 1.00 V M 400ns Ch1 ⨍ 1.04 V

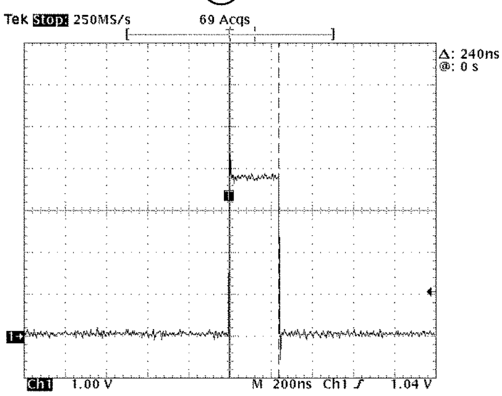
⑬


Tek Stop: 25.0MS/s 10 Acqs
Δ: 5.24 V
@: 5.24 V
Ch1 1.00 V M 2.00μs Ch1 ⨍ 1.04 V

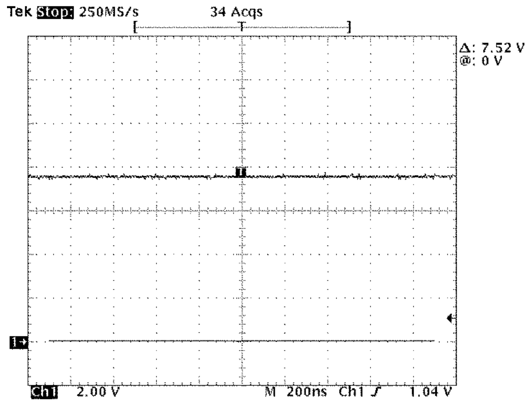
⑭


Tek Stop: 500MS/s 40 Acqs
Δ: 4.098MHz
@: 8.621MHz
Ch1 1.00 V M 100ns Ch1 ⨍ 1.04 V

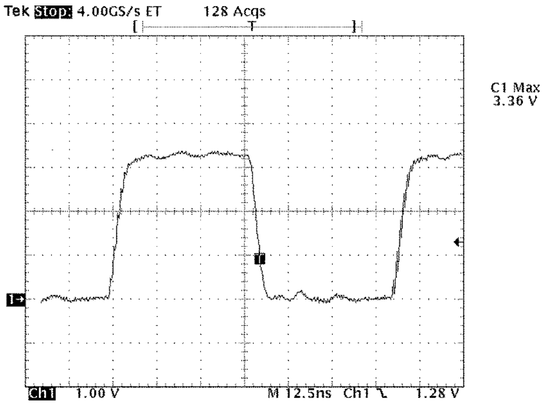
⑮


Tek Stop: 250MS/s 69 Acqs
Δ: 240ns
@: 0 s
Ch1 1.00 V M 200ns Ch1 ⨍ 1.04 V

⑯

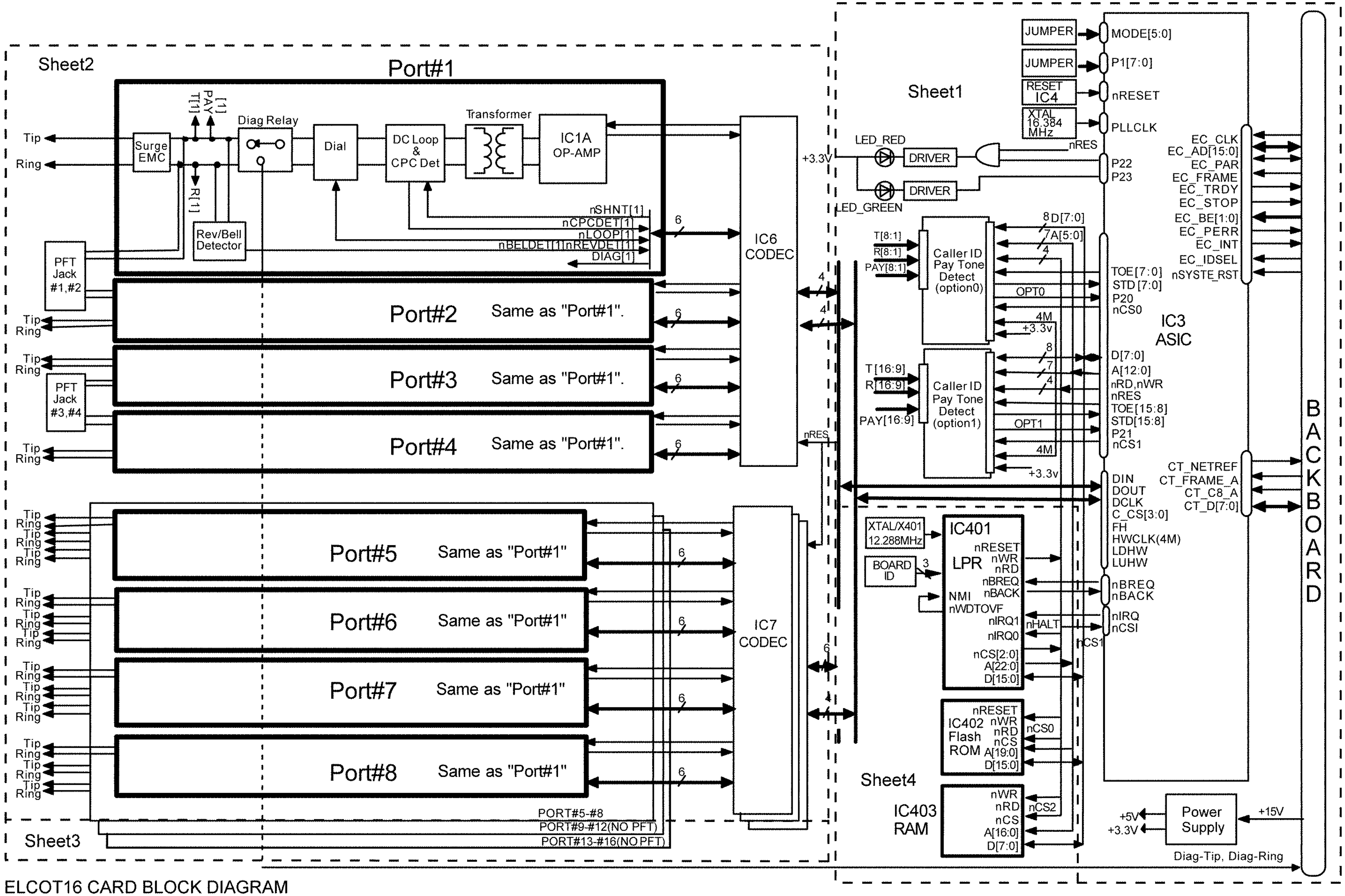

Tek Stop: 250MS/s
34 Acqs
Δ: 7.52 V
@: 0 V
Ch1 2.00 V
M 200ns Ch1 ƒ 1.04 V

⑰


Tek Stop: 4.00GS/s ET
128 Acqs
C1 Max
3.36 V
Ch1 1.00 V
M 12.5ns Ch1 ↘ 1.28 V

⑱

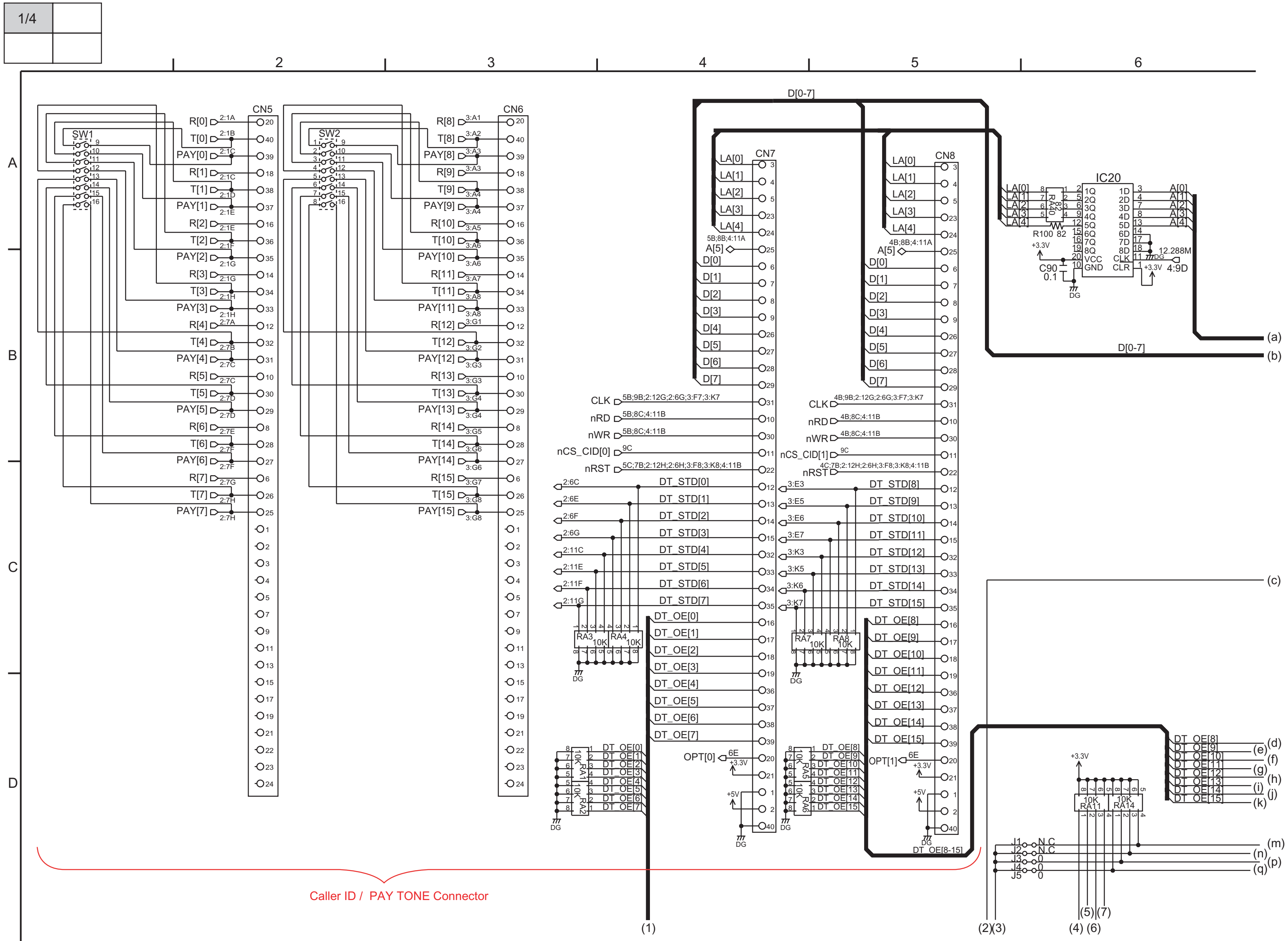
15.2. ELCOT16 BLOCK DIAGRAM



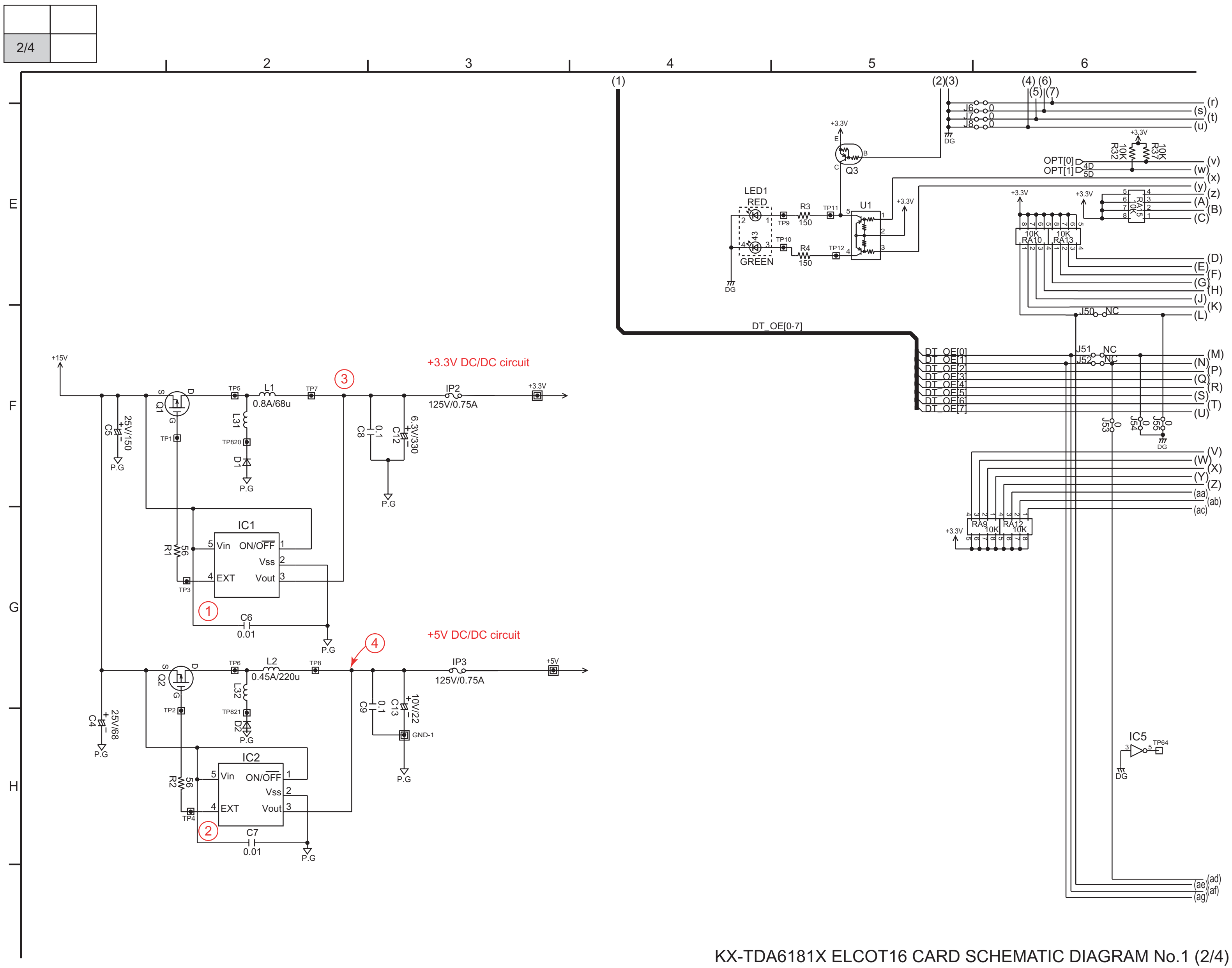
ELCOT16 CARD BLOCK DIAGRAM

16 SCHEMATIC DIAGRAM

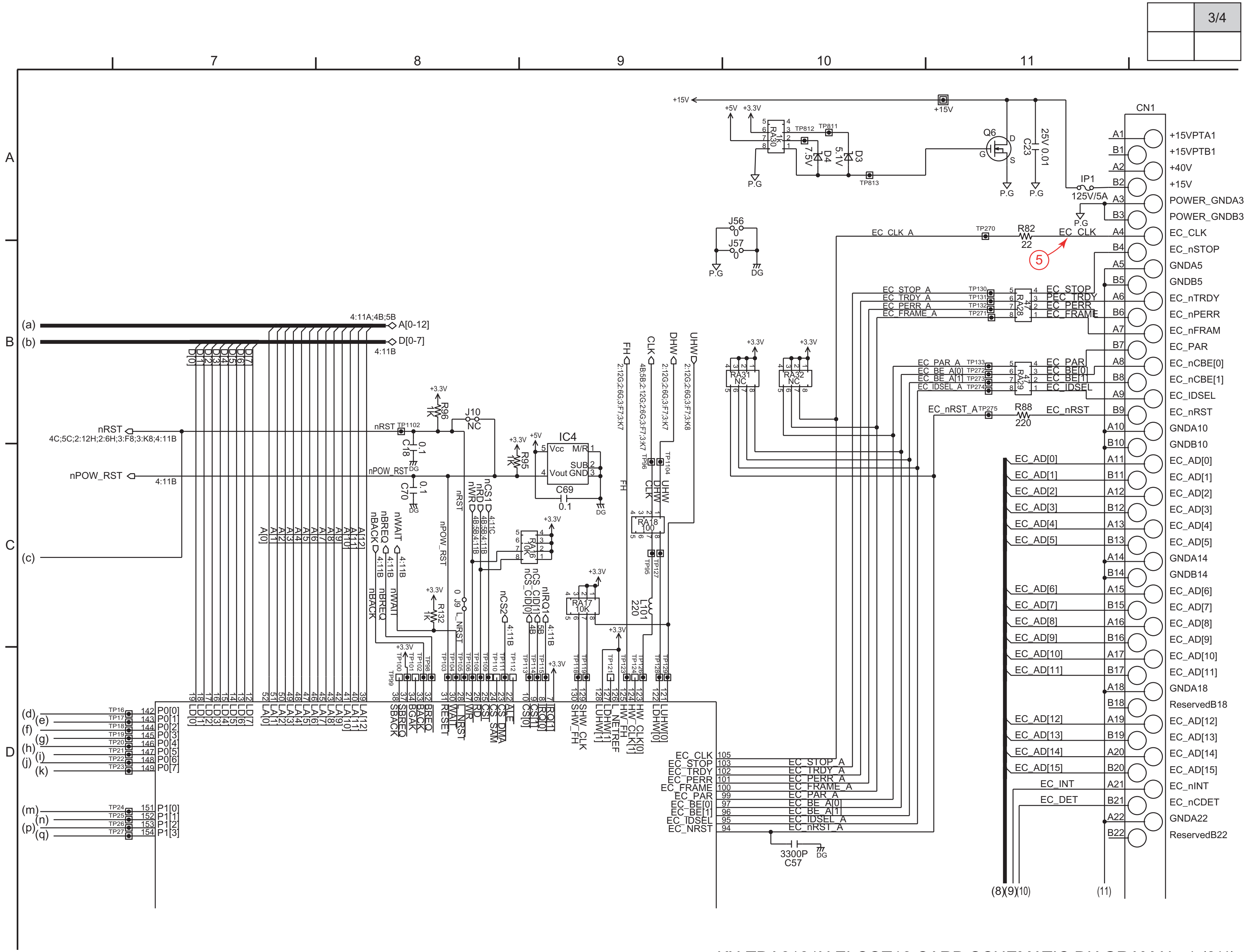
16.1. No.1



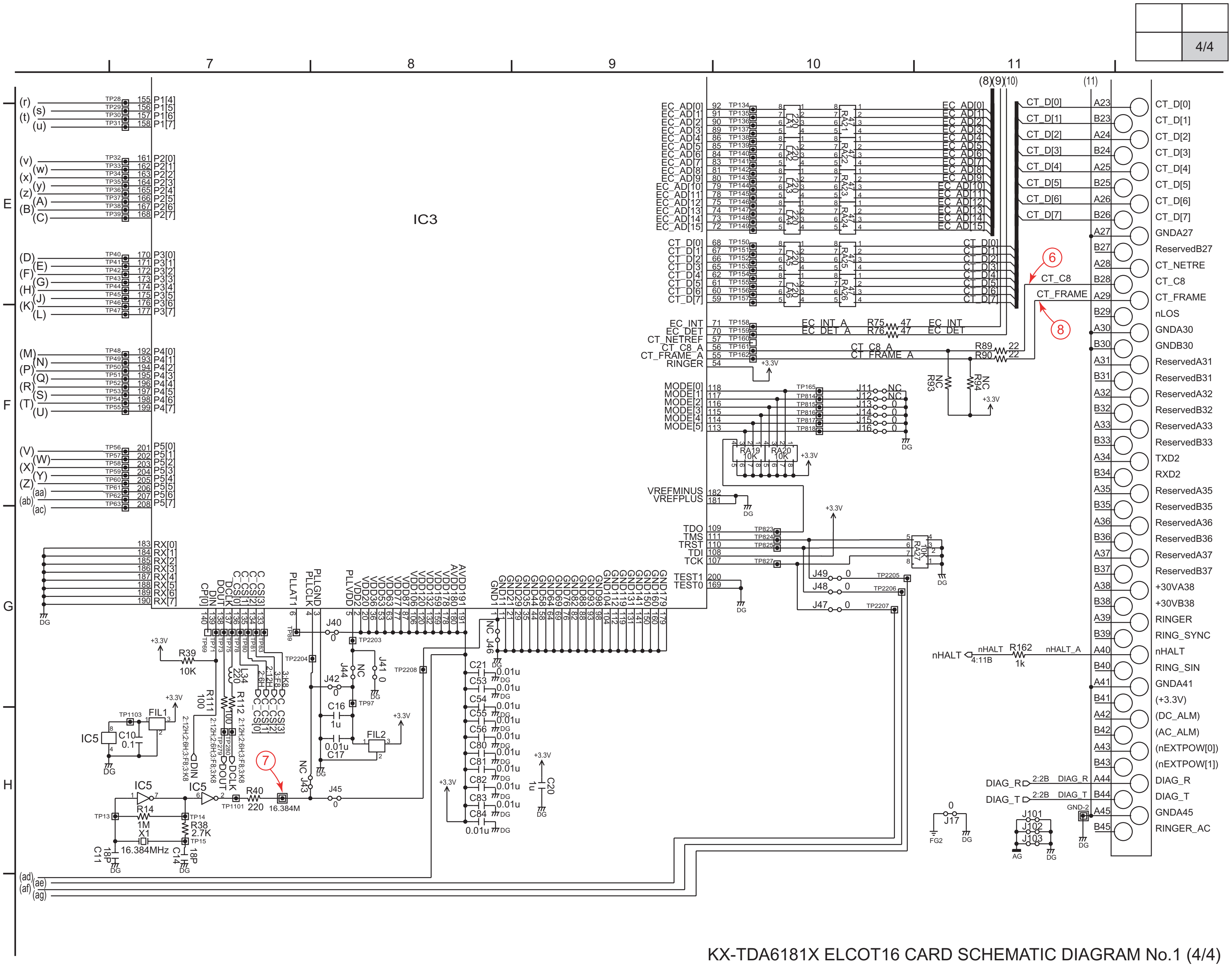
KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.1 (1/4)



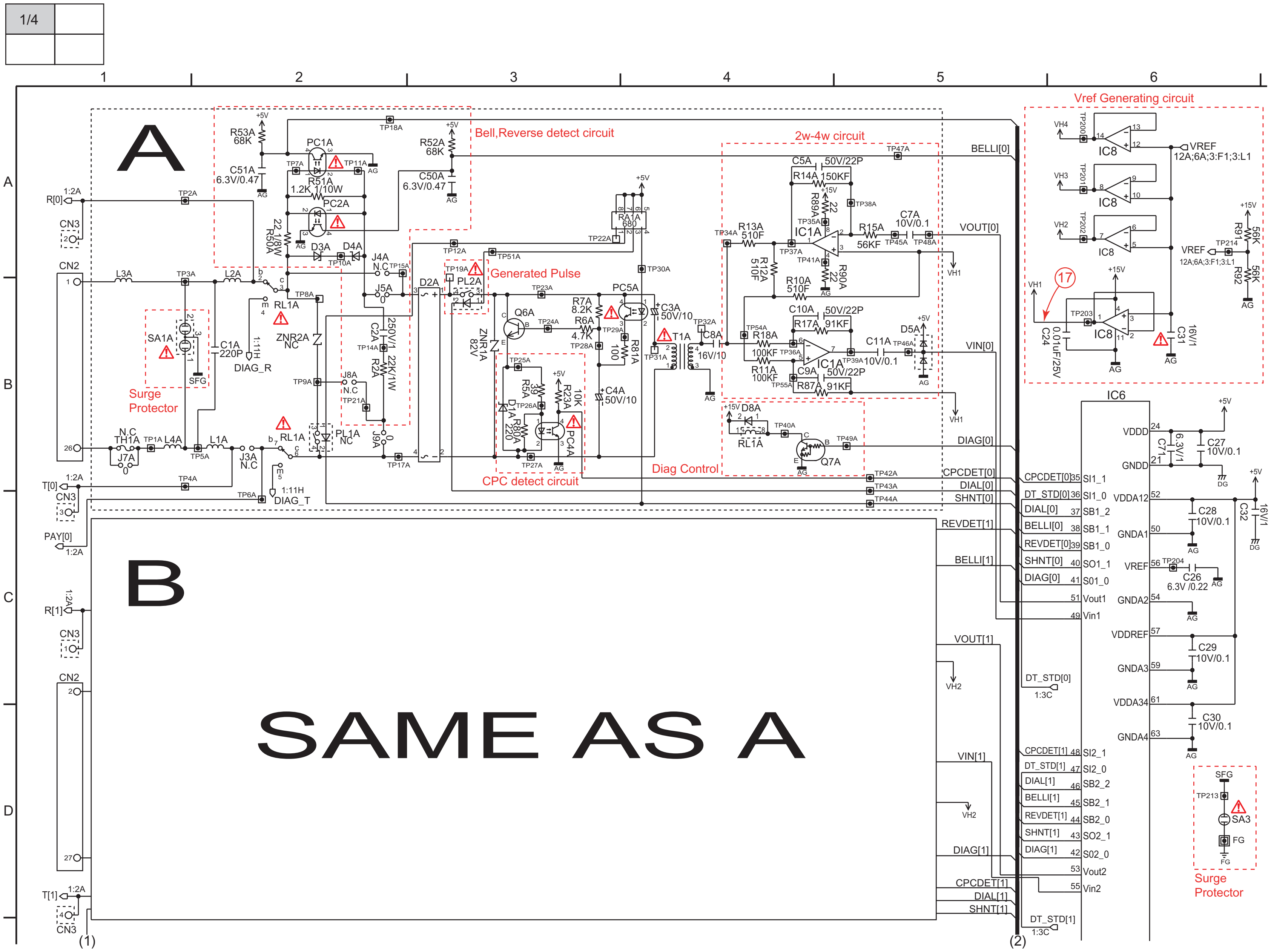
KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.1 (2/4)



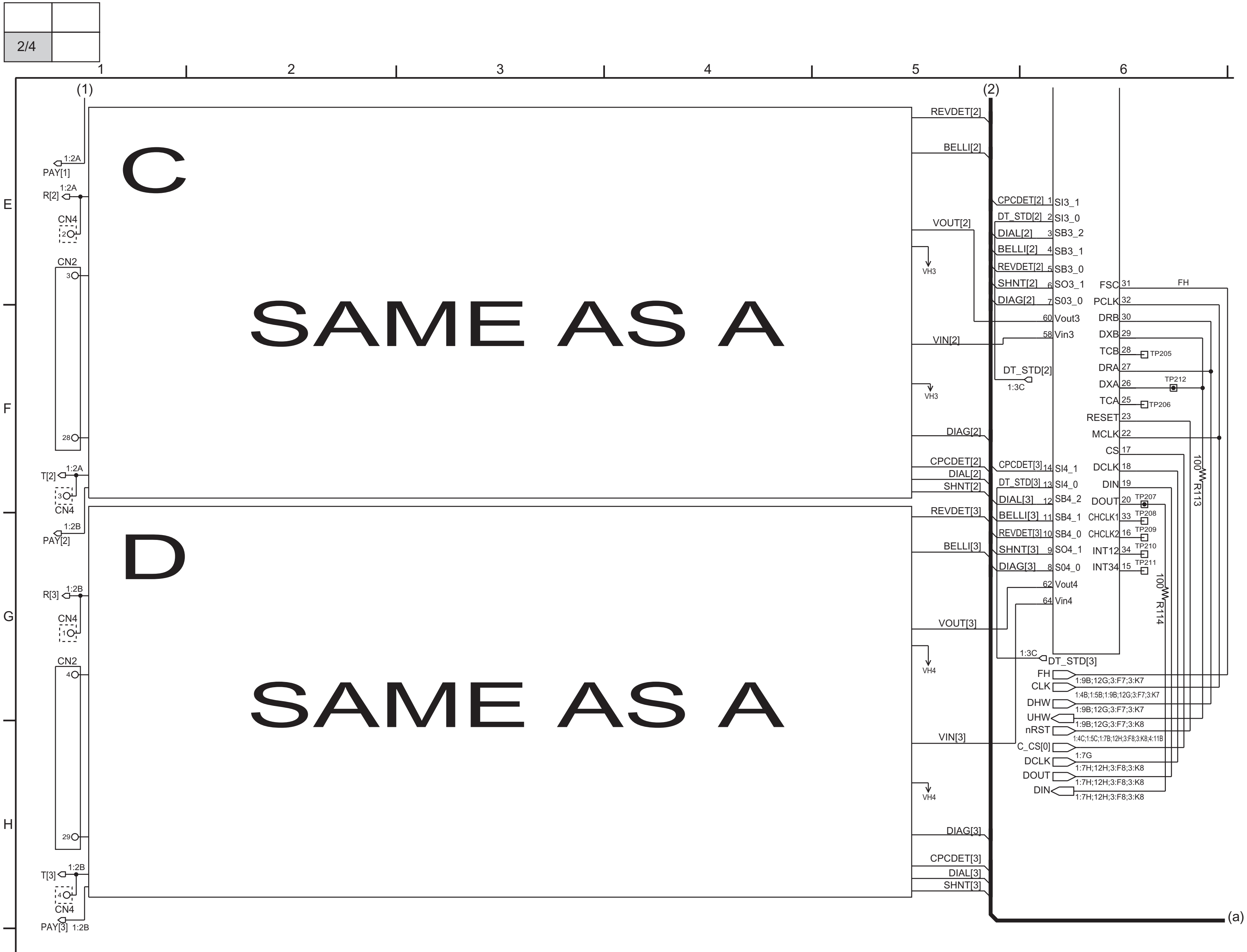
KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.1 (3/4)



KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.1 (4/4)



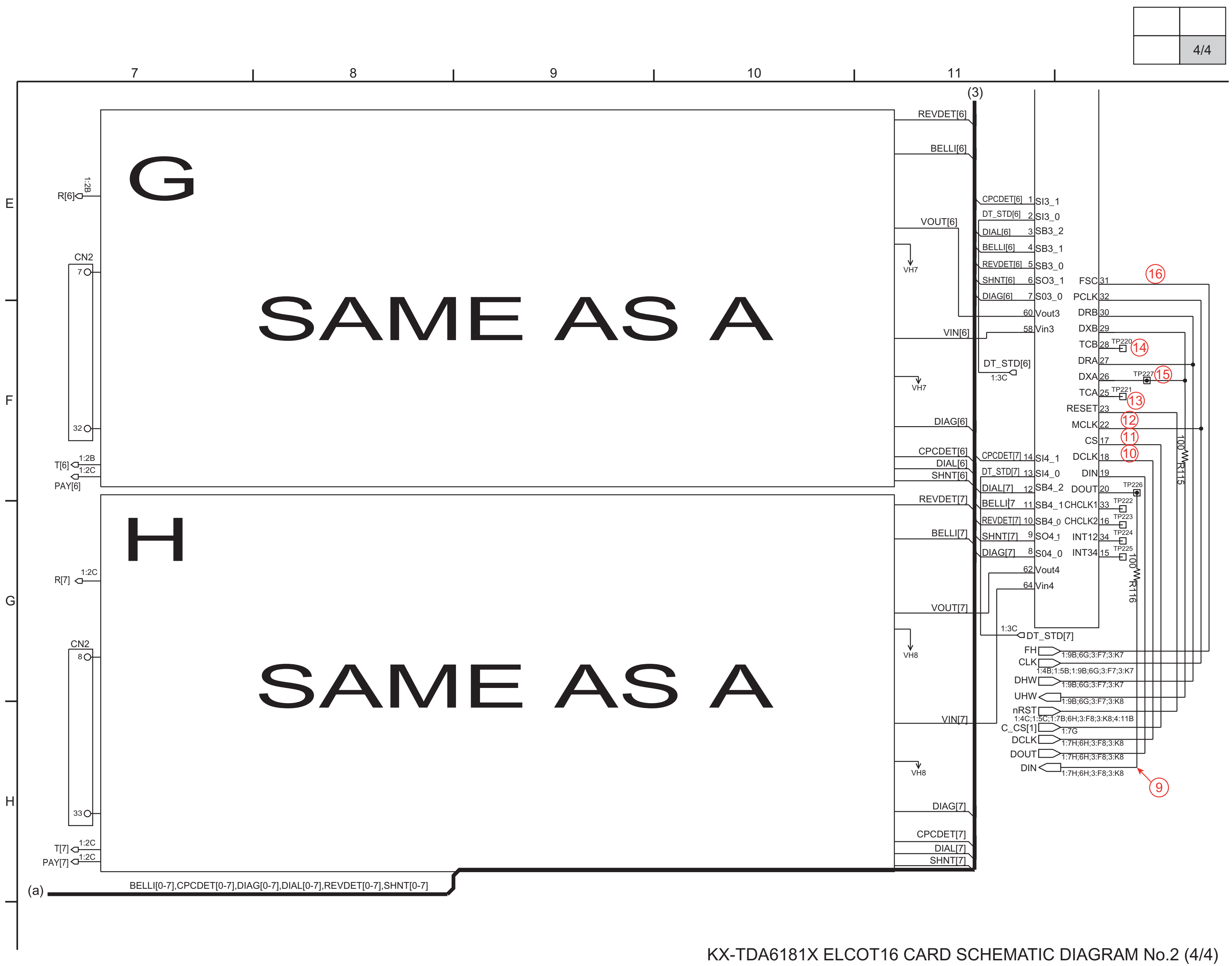
KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.2 (1/4)



KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.2 (2/4)



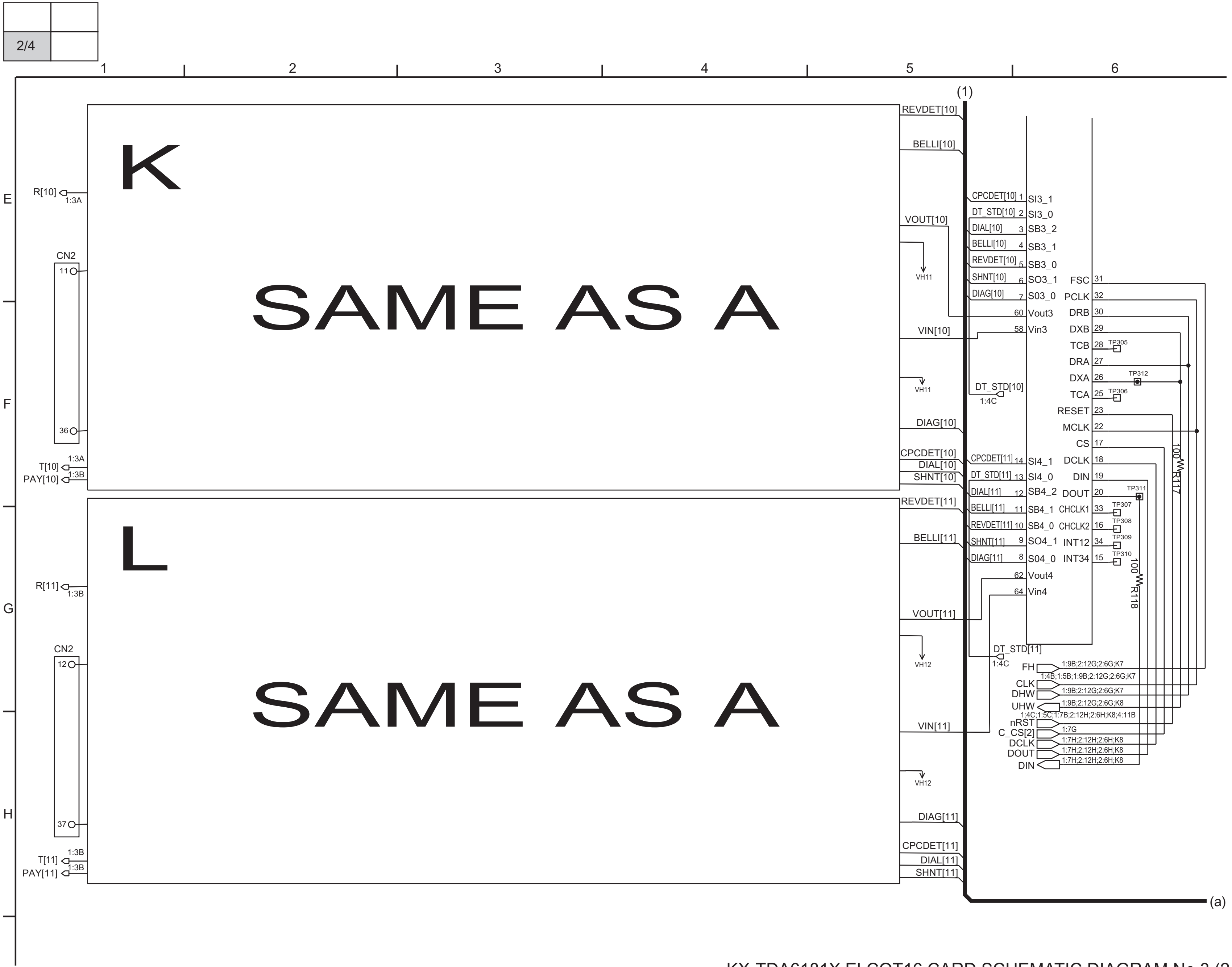
KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.2 (3/4)



KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.2 (4/4)



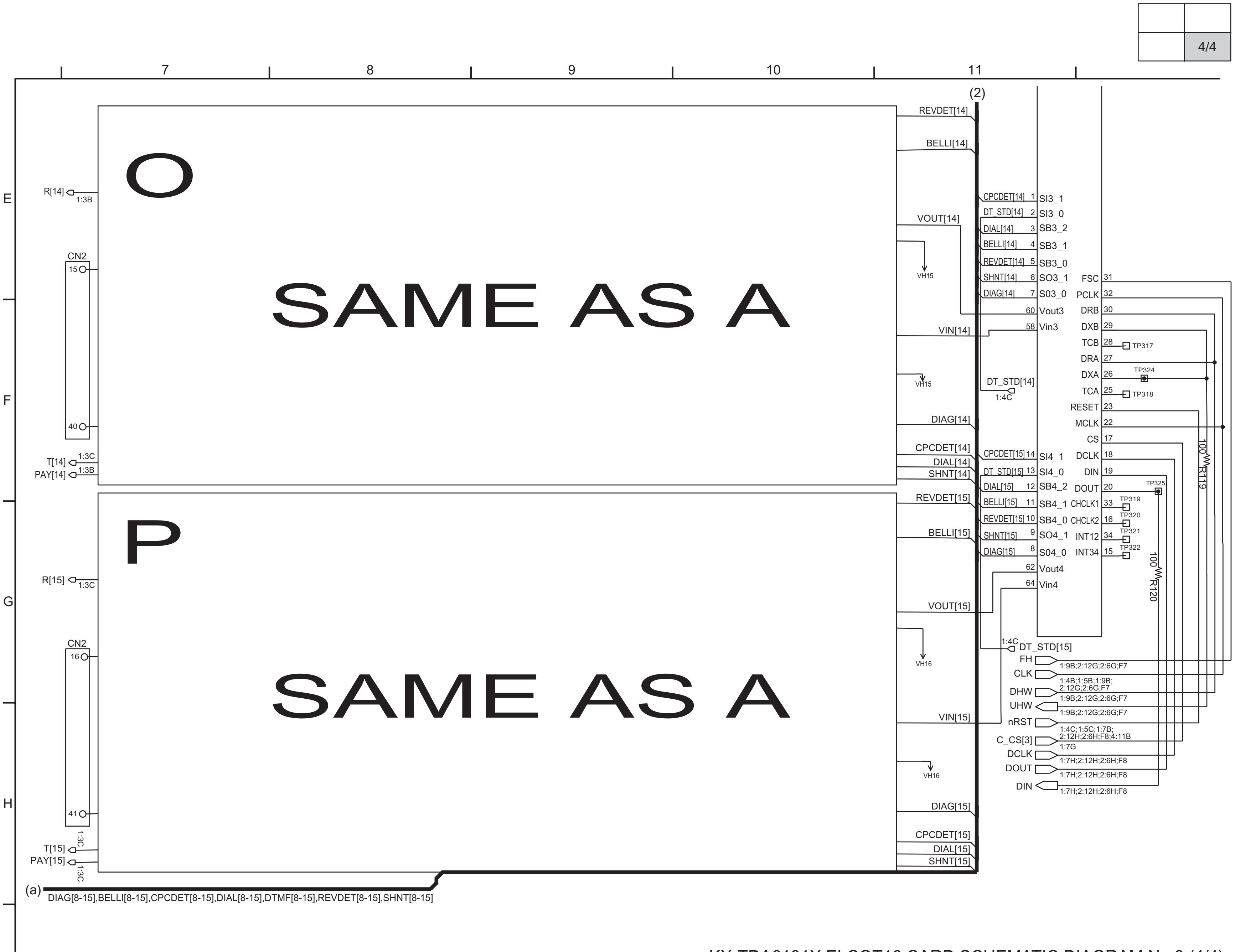
KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.3 (1/4)



KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.3 (2/4)

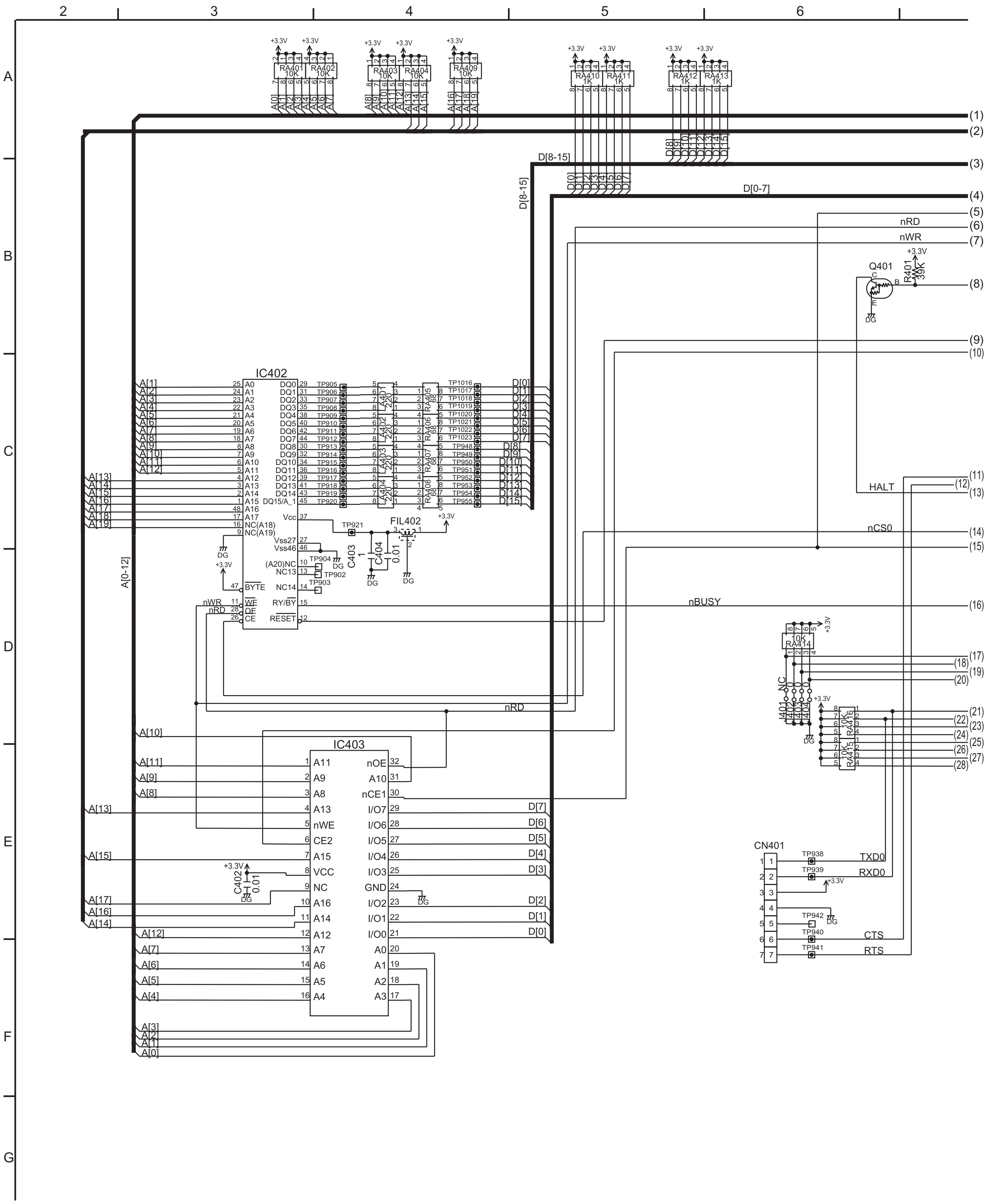


KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.3 (3/4)

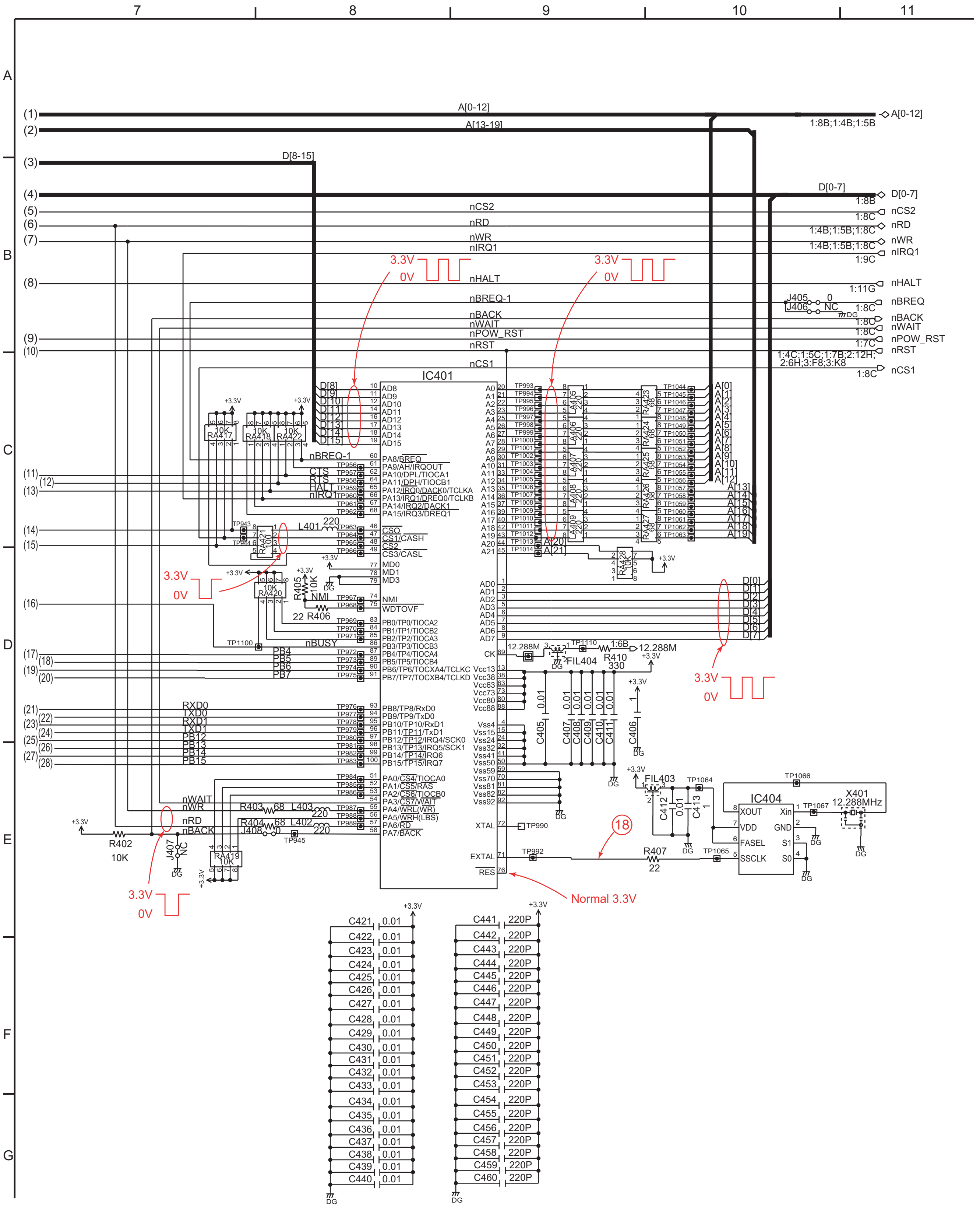


KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.3 (4/4)

16.4. No.4



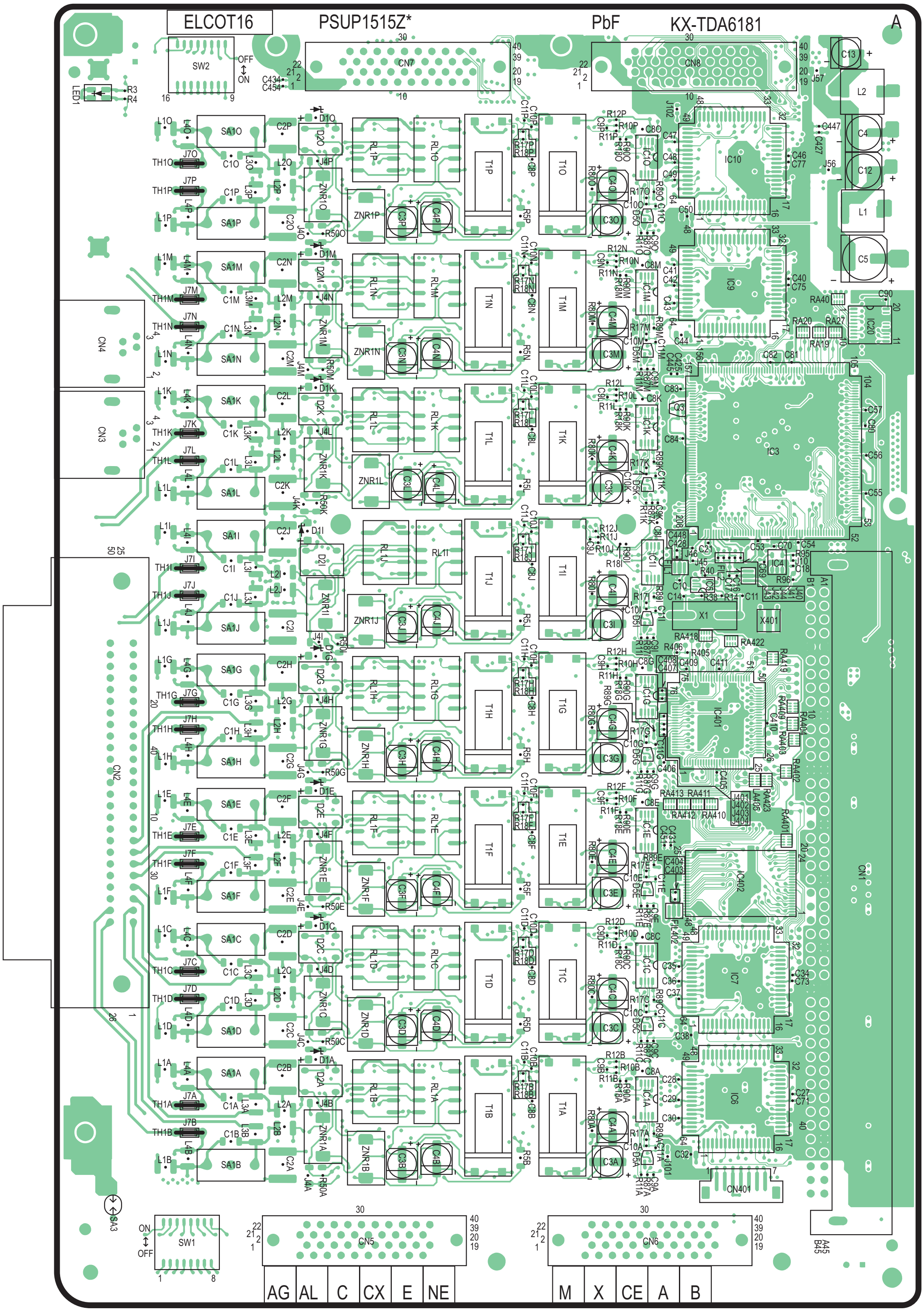
KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.4 (1/2)



KX-TDA6181X ELCOT16 CARD SCHEMATIC DIAGRAM No.4 (2/2)

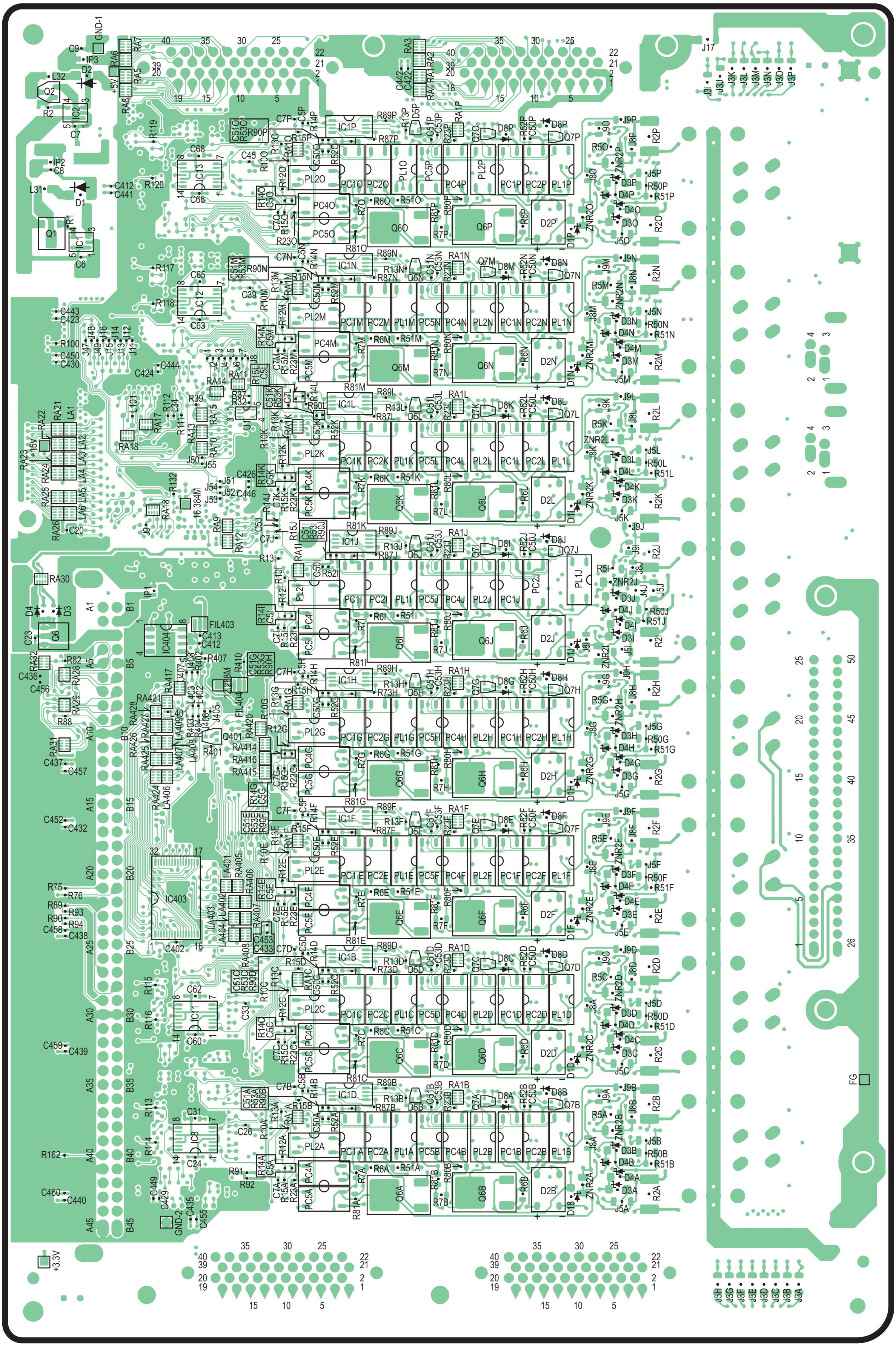
17 PRINTED CIRCUIT BOARD

17.1. COMPONENT VIEW



KX-TDA6181X ELCOT16 BOARD COMPONENT VIEW

17.2. BOTTOM VIEW



KX-TDA6181X ELCOT16 BOARD BOTTOM VIEW